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LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

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EDITORIAL NOTES.

Institution of Gas Engineers.

As we are going to press with this number of the "JOURNAL," the proceedings at the annual meeting of the Institution of Gas Engineers are well under way. The general business has been dealt with as planned in the programme, the President (Mr. John Wilkinson) has delivered his Presidential Address, and the technical work has been commenced. Glancing through the reports and papers, there is promise of much interest and instruction. Every meeting gives enlightenment regarding the developing technique of our progressive industry; and this one will be no exception. The papers also show how fresh ground in practices has been broken abroad; and we have now to keep in close touch with what is being done on the Continent and in America, in order not to get behind them in any part of our work. We have much to learn from overseas; and we venture to say there are lessons in our developments which are not without value to our colleagues abroad. The next issue of the "JOURNAL" will contain a complete, and fully illustrated, report of the meeting, which will be read by professional gas men in all parts of the world where gas supply obtains.

The Premier's Information.

WITH all respect, we think it may be said that, from the point of view of the gas industry, the education of the Prime Minister has in one matter been sadly neglected. He recently inaugurated the new super-power station at Stourport of the Shropshire, Worcestershire, and Staffordshire Electric Power Company. It appears that one of the reasons he did this was that he used to play cricket on the site on which the station is built; and he confessed that he found it like a "nightmare" to be standing there inaugurating the new power station. The happy memories of early cricket days and the Premier's equally happy ideas of what electricity, generated at an efficiency of 18 to 19 p.ct., is going to do for poor people, ought to have prevented anything so disagreeable as a "nightmare." But perhaps the reporter did not faithfully secure Mr. Baldwin's words. He also said, according to the newspaper before us, that the industrial revolution has covered part of the country with dirt, smoke, and poverty. Admitting the "dirt and smoke," we cannot help thinking that there is some error in the use of the word "poverty;" for the expansion of industry, before the war period heaped up its terrible penalties, was doing a good part in ameliorating the conditions of the poor. For 150 years, the Prime Minister states, a fight has been going on against those who would make the country clean and wholesome; and then he proceeded: "Now we have "called in science to our aid; and electricity is going to "be its handmaiden. Clean towns and happier rural "districts are lying just beyond the horizon if we put our "backs into developing this great power. I would like "to think that many here to-day will one day hear the "little children of Dudley, for example, ask their teachers "at school: 'Please, teacher, what was the Black Coun-"'try?' It has been one of the dreams of my life for "many years to see electricity brought into our rural districts, in the hope that one day we may find, at any rate, "parts of England where electricity plays as great a part "in the daily life of the poorest people as it does in "Sweden and Switzerland."

That is all very well for platform purposes; but it requires supplementing to be fair. And we believe the Prime Minister tries to be fair within the limits of his knowledge of what has occurred, and is really happening. No industry has fought harder than that devoted to gas supply in the work of eliminating dirt and smoke from our atmosphere—long before the electricity industry ever dreamed of following its example, despite the great handicap of a poor efficiency in the utilization of coal—an efficiency not yet equal to that with which coal can be used in the domestic firegrate—whether in the cottage or the palace. Long since, too, the gas industry called science to its aid—and not Government intervention or finance; but of the result the Premier does not appear to be cognizant. Its work has had a marked effect in reducing the smoke nuisance, in providing healthier conditions, in lightening domestic labour, and generally in adding to the comfort and conveniences of life for all sorts and conditions of people. In the lives of the poorer people, heat has a considerable place; and electricity cannot do for them as economically and efficiently all that gas has done and is doing. If Mr. Baldwin has time to look at the Board of Trade Returns relating to statutory gas undertakings, he will find that of the 8,200,455 gas consumers in 1925, no less than 4,446,618 were prepayment consumers. In the houses of gas consumers there are now close upon 6 million cookers and smaller cooking appliances (such as grillers) of which the gas undertakings know; of gas-fires, wash-boilers, water-heating apparatus, and laundry irons, no count has been kept. If the Prime Minister multiplies by five the number of cooking appliances known to be in use, to represent the members of families, he will find a surprising proportion of the population are using gas in their kitchens, to the exclusion of coal. In industrial heating and power operations, gas is indispensable. Something like 8 or 9 million tons of smokeless fuel in the form of coke is also disposed of annually. The foregoing numbers of consumers (ordinary and prepayment) and of cookers, &c., take no account of those connected to the mains of non-statutory concerns.

What all this means in reducing the pollution of the atmosphere must be obvious; and the good work is going on day by day throughout the country. The accomplished benefit is unacknowledged by the Prime Minister. It is on the achievement of the gas industry that electricity is trying to batten, with, in the best of circumstances, its 18 to 19 p.ct. efficiency in the utilization of coal. The Government are trying to aid the electrical industry to push electricity into a field for which it is thermally and economically unfitted. We are afraid that, much as we admire Mr. Baldwin, his knowledge of this subject does not comprehend the whole of the situation. If the abbreviated report we have before us of his speech at Stourport correctly mirrors his information on the subject, then it is shallow and extraordinarily incomplete. We wonder who his tutors have been that he should regard the work upon which the electricity industry is endeavouring to enter as being something new, while the gas industry has, without Government encouragement, been labouring at it—and, as statistics show, not unsuccessfully—for many years. Its work helped the country last year in a manner that is beyond adequate description.

Dr. Carpenter on Gas Measurement.

THE letter which Dr. Carpenter contributed to our columns last week (p. 637) on "Measuring the Make of Gas" is suggestive in more ways than one. We are afraid it is an all too common fact that we do not gain all we ought to do from daily experience, through inability to appraise the lessons at their full value, and to apply them to practical affairs. The loss is no doubt incalculable. It is not always the nescient who allow experiences to slip which may in themselves appear small, but in cumulative effect might be very valuable. Furthermore, it is not always those who possess knowledge who have the talent necessary to apply it to everyday affairs. It would be an excellent thing if those in charge of the technical work of the industry in any department would communicate for publication, as they occur, any unusual experiences which, by receiving general consideration, might perhaps result in practical benefit. We, at any rate, would welcome such use of our columns for the common good.

It was an experience which eventually led the South Metropolitan Gas Company to adopt their present practice in the measurement of the make of gas; and the relation of the experience, though it occurred close upon half-a-century ago, is as instructive to-day as it was then, and perhaps will be more fruitful now that Dr. Carpenter has put it on record at a time when gas measurement, unaccounted-for gas, and cognate matters are again much to the fore. Probably, however, the experience recorded in the letter would not have developed into something so notable and useful had the cubic feet measurements of the meters concerned in it been multiplied by the calorific value, and the tests of make had been based on the therm, and not on volume. But those were not the days of the therm. Let us briefly traverse the experience, and what has happened since in practice. The old Phœnix Gas Company had two works—one (the larger) under the charge of the late (then) Mr. Corbet Woodall, and the other (a medium-sized works) under the management of Mr. P. J. Wates. There was generally a difference in make in favour of the smaller works of several hundred cubic feet per ton of coal carbonized, as compared with the larger works. When Mr. Woodall retired, Mr. Wates took charge of the larger works; but he was unable to obtain the cubic feet returns per ton that he had succeeded in doing at the smaller works. The mystery was at length solved; and it was simply that at the smaller works the station meters were within a stone's throw of the purifiers, while those at the larger works were half-a-mile away. The reduction of the temperature of the gas during the long travel accounted for the difference in the measured make.

The result of, and the developments from, this interesting experience may be given practically in Dr. Carpenter's own words. The first result was that readings for barometric and temperature measurements were taken simultaneously with the indexes, and the latter readings were corrected to a common standard. Later on, the barometer containers were coupled direct to the station meter inlets (using double taps so that the columns could be verified by opening to atmosphere, and comparing with a standard instrument), thereby eliminating any errors due to heavy and light holders, and reducing meter indications to the true standard of 30 in. and 60° Fahr. The resultant figures are those which have been used and furnished by the South Metropolitan Company for a great number of years; and they are specially useful now that the adoption of the therm system encourages the preparation of definite balances of carbonizing efficiency. Another interesting point is that, for convenience and simplification, the Company's station meter indexes have been altered to read direct in therms (uncorrected for pressure and temperature), and the gasholders are similarly calculated and tabulated. Dr. Carpenter would be doing a service to the gas profession by supplementing his reference to the alteration of the station meter indexes by a description of how it has been done. Concluding the letter, it is mentioned that a systematic method of temperature records provides important information for differentiating between what is often called unaccounted-for gas, true leakage, and unpaid-for gas.

Dr. Carpenter's communication should be valuable to others. It is important that both our technical and commercial data should be founded upon uniform conditions, and be beyond suspicion.

Principles for the Railway Rates Tribunal.

THE National Gas Council, on behalf of the gas industry, recently appealed against the judgment of the Railway Rates Tribunal with regard to the proposed new schedules of standard charges put forward by the Railway Companies. The matter was discussed before the Court of Appeal at three sittings; and the decisions of the Lords Justices on the points submitted to them were given at a fourth sitting. Over the result there can be satisfaction on two grounds. In the first place, the Court were of opinion that the matter was of overwhelming importance to the public, seeing that the principles upon which railway charges generally are to be fixed in the future had been under consideration. This means that the public and other industries—especially large buyers of coal—who use the railways for transport are under an obligation to the gas industry for having submitted the principles in question to the determination of the Court. In the second place, while the Council cannot claim to have obtained a clean-cut victory, they have achieved the results which they set out to obtain—viz., to safeguard the position of the industry in connection with future applications for revision of standard charges under section 35 of the Railways Act, 1921, or when standard or exceptional charges are periodically reviewed by the Tribunal under section 59. The Lords Justices upheld the three contentions put forward by the Council; but, in view of the fact that they were unable to say that these were pure questions of law, no appeal can lie. However, inasmuch as, in the opinion of the Court, the Council were fully justified in appealing, costs were refused to the Railway Companies. The points submitted, and the views of the Court upon them, are concisely presented in our "Legal Intelligence"—thanks to permission being given to us to reprint notes upon the case from the monthly report of the National Gas Council. There will be general agreement that the decisions of the Court will be valuable in the future—not only to the gas industry, but to others. We congratulate the Council upon the result, which shows that their action was completely warranted.

Reinforced Concrete.

REINFORCED concrete construction is accepted by the members of the gas profession as an indispensable component in much of their engineering work. We cannot see how it could be otherwise, having regard to the long experience there has been (in all types of work, under all sorts of conditions, and subject to a large diversity of everyday working test) with this form of construction, which has proved its virtues in respect of strength, durability, ability to resist shocks and vibration fire-resisting properties, saving of space, and economy of upkeep. It is economical in first cost, and can be rapidly executed. These merits are set out in the paper which Mr. C. C. Markham, Chief Draughtsman of the Newcastle and Gateshead Gas Company, read at the Auxiliary Meeting of the North of England Gas Managers' Association last Saturday, and which sums up the considerations of an extensive subject in an admirably concise and plain way. When reinforcement of concrete was first introduced practically, there were fears as to what might happen to the steel and to the combination of the steel and concrete; but time (which settles most doubts) has dissipated them. With the passing years, nothing but good is reported where work has been carried out properly; and the experience is widespread. In practice, as Mr. Markham says, it is found that work designed to use ordinary round mild steel bars, as rolled by British steel makers, is able to compete successfully from every point of view with any patented or other system employing special steel, and furthermore is to be preferred. While there can be agreement with Mr. Markham, that there is no particular merit in one patented system over another, or over the plain

system he prefers, there is this to be said—that those who specialize in this particular form of construction have gained a tremendous experience, and can be of great assistance to those who are contemplating a large application of reinforced concrete. In that experience there is, in our opinion, more value than in any particular type of reinforcement. Moreover, such firms possess all the necessary plant required for the work. It therefore becomes a question of whether the conveniences and experience which they can offer have value in them commensurate with any difference in cost between carrying out the work by contract or administratively. There has been, as Mr. Markham says, rapid improvement in the resistance and durability of reinforced concrete; and this is due to a better understanding of the necessary care and refinements, which enhance not only strength, but the economic value of this form of structure. The materials must be clean and of the right physical properties, and, if a little science is applied on the lines laid down in the paper, good results are bound to ensue. All these matters are dealt with by Mr. Markham theoretically and practically; and if those who are contemplating engaging in this form of work will follow his advice as to the lines of procedure, they will find him a safe counsellor. Reinforced concrete has been utilized for many purposes and in many situations on gas-works; and, by way of illustration, the paper briefly describes the coke-recovery plant at the Redheugh Works of the Newcastle and Gateshead Gas Company, at which station and the Elswick one reinforced concrete has been largely applied.

The Revolution in Sales Practices.

WHEN we look back at the methods of developing gas sales of many years ago, they appear primitive and even amusing in comparison with the requirements of the present time. The rapid growth of the practices of the industry in this relation has been truly remarkable, though in many areas they still fall far short of the most approved and effective forms. The gas manager to-day is judged not as was the case at one time solely by his carbonizing returns, but regard is also had to the efficiency of his sales department and the methods applied. But not all gas administrators and managers have risen to a sufficient appreciation of the altered circumstances; not in all cases have managers yet learned the truth that business development begins not with what they are doing on the works, but with the adequacy and efficiency of what is being done at the point of contact with the public. That is where we meet with competition; there is no competition in respect of gas production *per se*, though we do not belittle it, seeing that it is highly important, and now more so than ever, in providing cheap gas to help in the expansion of business. The paper that Mr. L. M. Weldon, Commercial Assistant of the Hartlepool Gas and Water Company, read last Saturday at the Auxiliary Meeting of the North of England Association, traces developments of the methods applied to gas sales work in the Hartlepools. The Company were among those who early realized the necessity of launching-out into work for obtaining new custom rather than sitting and waiting Micawber-like for it to turn up. But if what was done a few decades ago by the Company was to-day considered sufficient to constitute a system for business exploitation, there is absolute certainty that the undertaking, or any other which so deliberately sinned against modern ideals and necessity, would go under, and thus would only meet with its just deserts. The old way of doing things was, so to speak, to keep ourselves hidden away in the deep shadows. We were content with showrooms at the works to which few people were attracted; to spend money on advertising was an uneconomy which could not be tolerated; starvation at the sales end, with concentration upon gas manufacture, was considered proper. Business was more or less allowed to come as it would, and was not sought after.

All that is now changed. In the paper, every new developing step in sales practices that the Hartlepool Gas Company have taken is seen to have given a fresh fillip to business. When they opened their permanent showrooms, the orders began to flow until they reached large and healthy numbers. Advertising has been elevated from something intermittent into persistent publicity; and, as is shown by the paper, the avenues are many of which use is made for this purpose. The Company operate in a district in which there is keen electrical competition; but, notwithstanding all the work they do, we have the fact presented that the amount expended by them annually on advertising and propaganda works out to only about ¼d. per 1000 c.ft. of gas sold. They have spring and autumn campaigns, and periodically offer free fixing—always with the same result, that each contributory method produces an increase of new business. An agreement has been entered into with the master plumbers for carrying out work for the Company at rush periods; and though under this arrangement some 500 gas fires and 700 cookers have been fixed to the Company's orders, very little has been found of which to complain in the quality of their work. We are glad to read this testimony, as there has been such a diversity of opinion concerning the employment of outside firms for fitting work that there is a proneness in some quarters to consider that all work so deputized is of inferior quality. The testimony shows that efficiency can be realized if the work complies with specification; and there is inspection in the interests of the undertaking concerned.

There may be hearty congratulation to the Company on the careful manner in which they deal with sales development. A census of gas appliances in their area is an important basic factor in their operations. To obtain this census entailed a certain amount of expense and trouble; but the usefulness and the results which have been derived justify both. The system has been a considerable aid in circularizing householders, inasmuch as—to give an example—it is futile to send circulars treating of cookers to householders who already use them. It is also a most useful guide in the work of securing the adoption of the means for obtaining additional gas consumption through existing service pipes. Further, when the census was taken, it was found that many consumers had in use apparatus which was not working efficiently; and much of this was due to the fact that the appliances had with time become in some particular defective or dirty. Mr. Weldon is satisfied that the census did much good in this direction. In addition, orders were received by the men engaged in taking it. Passing on, the author deals with mantle maintenance, school lighting, and high-pressure lighting; and in all these respects a progressive policy has brought new consumption to the Company, or has preserved old business in lighting which might have been wrested from them. These sections of the paper are well worth reading, as also is one dealing with cookers on slot installations. In this last-named connection, the value of the cooker in developing consumption is clearly demonstrated. It is found by the Company that, on the average, the consumption of a working-class house with a cooker is 10,000 c.ft. more than the average of the houses where there are no cookers. The Company's experience in connection with the Corporation Housing Estates is that, though electric light may be used, gas consumption can be stimulated to no mean order through cookers, boilers, and fires. Looking at the tabular statements in the paper relating to this matter, it is seen that where electric light is used, and a gas cooker and boiler are fixed, the average consumption last year was 18,000 c.ft.; where a cooker, boiler, and fire are in use, the average was 24,700 c.ft., while the average consumption in an artisan district with gas lighting and cooker amounts to 25,800 c.ft. The figures show that, by the installation of a cooker, boiler, and fire, the consumption in a Corporation house, despite the use of the electric light, approaches near to the average consumption in an artisan district.

These comments only indicate the large scope of a paper which details the experiences of one Company. With their methods there may not be general concurrence. The principle of a broad policy in this matter is generally agreed to; but methods may be subject to divergent opinions. Some managers may submit that the Hartlepool plans do not go far enough; others may say that in some respects they exceed what they themselves would do. To us the main lesson of the paper is that, with every development in the sales methods of the Company, greater

success has been achieved. Mr. Weldon does not say that what the Company are doing represents finality. They are at present satisfied with the results of departing from old methods and establishing new ones; and we may be sure that, when new and acceptable ideas come, or fresh necessity prompts, there will be development beyond the lines of procedure as described in this instructive and (we hope) activating paper.

Coal Blockade in France.

The French decree which places an embargo on the importation of coal into France came into force last Friday; and now it is only possible for it to enter the country under licence. The object the French Government had in imposing this was to pacify the French mine owners, who complained bitterly of over-saturation of the markets, and increasing unemployment at the mines. In the Pas de Calais and Nord, there is an accumulation of unwanted coal, estimated at round about 2 million tons. It is stated that the licences will be granted only to small importers, and refused to large concerns—such as gas-works and railways. The Government apparently regard this as an economic step, but it is obvious that they have not considered the counterbalancing uneconomic effects on the production of necessaries, and the increased cost to French consumers and external customers of the country's goods. It is believed that the decree will inevitably entail an advance in the cost of living. Since the Government decided upon this measure, it has been roundly denounced by the industrialists of the country, the coal importers and shippers, and the economists. The industrialists ask why should there be such consideration of the mining industry, to the hurt of other French interests. The coal importers and the shipping interests point to the great injury that has been done to them. The economists are inquiring how electricity, gas, and other commodities, already dear enough, are to remain at their present price if the native raw material is protected by the Government, and competition is shut out. The Government have been urged to rescind the decree as early as possible in the interests of industry generally, and the free play of competition.

The British coal industry is greatly concerned over the prohibition; and the owners point to the want of recognition in the act of the French Government of the sanctity of contracts—there being many running at the present time. French industrialists, as is the case with other Continental consumers, highly appreciate the better quality of British coals for particular purposes, with the result that in 1925 the demand of France for our coal was approximately 10 million tons. The British coal industry, already in a state of severe depression, will feel very acutely the blow from the French Government. It may be only temporary; but, even so, in the circumstances there will be a heavy loss, which is hard to suffer, seeing that, looking farther afield, Italy is now a smaller buyer of British coal, and trade with Spain has been adversely affected by decrees limiting the use of foreign coal in the case of railways to 15 p.ct., in electricity undertakings to 20 p.ct., and in metallurgical works to 50 p.ct. The British miners' officials also see good reason for concern; but why not move the International Miners' Federation? Or is it at length realized, after last year's experiences, that self-interest is rather a potent factor in organizations of international constitution? During the seven months' stoppage here, the Miners' Federation appealed several times to the international body to do something effective to stop the exportation of coal to this country. The International Federation were powerless to do anything without involving the Continental miners in the same straits as those into which the British Federation had plunged their members. Now the boot is on the other leg. It is a question of protecting the miners of France against the importation of British coal into their country. The miners of France are hardly likely to be so foolish as to cease working on account of the worsening of the British coal miners' conditions through the action of the French Government. They are, as events have proved, more alive to the protection of their own interests than the British Miners' Federation are in protecting the interests of the miners here. The singular ideas of the latter as to the way to do this inevitably cause further injury to the provision of work for the British miners. In other words, they believe in trying to gain their ends by destruction rather than construction.

However, everything that can reasonably be done at home to help the British coal industry in their difficulties should be done. This is the season of low demand for coal. Those industries which are in a position to store coal ready for next winter may find the opportunity suitable for doing so.

Revaluations.

In connection with revaluations under the Rating and Valuation Act, 1925, the National Gas Council recently decided to set up in each district Rating Reference Committees, to which gas undertakings can refer any questions of difficulty relating to this matter. They are urged to take advantage of the information and advice which District Committees will be able to give in cases where the assessment has been increased, or appears in any way excessive.

A Popular Talk on Gas.

In connection with popular talks on "How It's Done" arranged by the B.B.C., Prof. Arthur Smithells, F.R.S., gave fifteen minutes' broadcast on June 7, on the making of coal gas. The talks are intended to interest the ordinary uninformed listener, and to give an outline of how some things of everyday use are made. Prof. Smithells kept to a very simple treatment of the subject, including a brief reference to history, to the operations of the retort-house, and to the bye-products of gas-making. He alluded to the variation in the demand for gas, and the functions of the gasholder, concluding with a statement regarding the losses entailed in the burning of raw coal.

Smoke Abatement Act—July 1.

The Smoke Abatement Act comes into force on the 1st prox. Lord Newton has pointed out that the success of the Act depends almost entirely upon its administration. He thinks it is desirable that local authorities should confer together on the subject, and discuss practical measures of common interest. A step in this direction has been taken by local authorities in the London area, who have agreed to hold a conference at the invitation of the Smoke Abatement Society. This example, his Lordship thinks, might with advantage be followed in the provinces.

Origin of Goods.

From to-day, it is illegal to sell in this country goods imported from abroad which bear the name or trade mark of a British manufacturer, unless accompanied by an indication of their origin. This is a provision of the Merchandize Marks Act passed last December; and only in the case of such goods as may be specially exempted by the Board of Trade will the obligation be waived. Another part of the Act, which came into operation on Dec. 15 last, deals with the procedure to be followed in the case of goods not bearing a British trade mark. If it is desired that imported goods of particular classes or descriptions should be marked, an application can be made to the appropriate department by persons substantially representing the interests of manufacturers, producers, dealers, or consumers, or of any body of wage-earners. Two Standing Committees have been appointed to deal with such applications.

First Quarter's Working.

The Board of Trade in their review of the coal-mining industry for the March quarter of this year give a number of data which show that, had trading after the stoppage realized at once normal conditions, a healthier state of affairs would have been attained by the industry. In the March quarter of 1926, the estimated tonnage of saleable coal raised was 66,758,300 tons. In the first quarter of this year, the quantity was 66,258,800 tons, which shows that the amount was less by 499,500 tons in the past quarter than in the corresponding one of 1926. Of course, preceding the stoppage, the coal industry was heavily handicapped by being overmanned. The average

number of wage-earners on the colliery books in the first quarter of 1926 was 1,101,700, as compared with 1,005,400 in the first quarter of this year. Using these figures, it is found that the average production of saleable coal per wage-earner was in the March quarter of 1926 60·59 tons; in the first quarter of this year, 66·9 tons—a difference of 5·31 tons, which, when multiplied by the number of wage-earners, represents upwards of five million tons for three months, or at the rate of more than 20 million tons a year. The number of work-people on the books of the collieries at the end of March last was 80,900 less than at the commencement of the dispute at the end of April, 1926.

The Miners' Federation.

Although the continental miners were greatly in favour of Mr. Frank Hodges retaining the position of Secretary of the Miners' International, he has resigned. The Executive of the British Miners' Federation raised the question on the ground that Mr. Hodges had become a member of the Electricity Board; the real reason in the background was that Mr. Hodges was, during last year's stoppage, one of the strongest critics of the Executive of the Federation. During the years he was their Secretary—that was before other spheres for his talents opened up—he was the best counsellor the organization ever had. Since he officially left it, things have been going from bad to worse in connection with it and the miners' interests generally with the extraordinary Mr. Cook at the helm. There has recently been a delegates' Conference, at which Mr. Hodges' resignation as Secretary of the International Federation was "accepted," and approval was given to the attitude taken by the Federation representatives in bringing it about. This is natural, seeing that Mr. Hodges is not in sympathy with the extremists who remain in occupation of the much battered and shattered Federation. Among other doings of the Executive, they have resolved to support an application by the Russian miners to join the International Federation. These peculiar people have also passed a resolution in favour of State ownership of minerals, expressing preference for confiscation instead of compensation. They have registered their protest against the Trade Disputes Bill. Indignation has also been expressed by them at the alleged "victimization" which is going on in the coal-fields as a result of the stoppage, for which and the destruction of employment involved the Federation were responsible. However, nobody seems to pay much attention to what the Executive of the Miners' Federation are doing nowadays, and this is a good thing.

PERSONAL.

In the Birthday Honours List appears the name of Mr. ADOLPHUS SYDNEY FRANCIS, Engineer to the Gas and Water Department of the Clacton Council, upon whom has been bestowed the honour of M.B.E. (Civil Division), in recognition of his services in connection with the Essex County Special Constabulary. Mr. Francis is the Superintendent of the Clacton Division of the Special Police, embracing an area from Marks Tey to Clacton and from Harwich to Mersea. He has been a member of the Special Constabulary practically since its formation in 1914.

"Inside the wallet containing treasury notes there is another paper which money cannot buy, for it is priceless." These were the closing words of an impressive tribute by Mr. J. W. McLusky, Engineer and General Manager to the Glasgow Corporation Gas Department, when, at a large gathering of the staff in the City Chambers on May 28, he presented Mr. J. SMITH, the Chief Clerk, with his colleagues' gift on the occasion of his retirement. Mr. Smith carries with him the whole-hearted appreciation and regard of his colleagues—a precious possession now that his pen is laid aside following 46 years' service of duties faithfully and meritoriously accomplished. The foregoing supplements the information given in last week's "JOURNAL." It may also be mentioned that the Gas Committee have minuted their appreciation of his worth—another notable tribute. Mr. Smith joined the Department when the Gas Office was at 42, Virginia Street, and served under three General Managers, Mr. W. Foulis, Mr. A. Wilson, and the present Chief, Mr. McLusky. He was also waited upon by a deputation representing his outside business friends who desired to honour him. Mr. Sinclair, who presided, asked Mr. Smith to accept on behalf of his wife a silver tea service, and for himself another wallet of treasury notes. Mr. Smith has gone to reside at Ayr, of which town Robert Burns wrote:

> Ayr which ne'er a toon surpasses
> For honest men and bonnie lassies.

Thus has Ayr gained another honest man whose magnetic personality will, as hitherto, attract friends.

Mr. HARRY BLYTHE, of Great Harwood, has been appointed Clerk of Works and Technical Assistant to the Colwyn Bay Urban District Council. Mr. Blythe first went to Great Harwood in 1920, on behalf of Messrs. Robert Dempster & Sons, Ltd., of Elland, to supervise the erection of new plant; and he entered the service of the Accrington and District Gas Board four years ago as Carbonizing Manager.

The marriage has taken place of Mr. CYRIL E. HARRISON, eldest son of Mr. A. J. Harrison, of Heynecourt, Great Harwood, Engineer and Manager of the Accrington and District Gas Board, and Miss Ethel Wood, daughter of Mr. Edward Wood, of Holme Hill, Scott Park, Burnley.

OBITUARY.

The death at Bournemouth is announced of Mr. ROBERT SURTEES, Deputy Gas Engineer of the City of Stoke-on-Trent. Mr. Surtees had been connected with the gas undertaking throughout his life. As a boy he went to the Longport Gas-Works, which was then under the control of the Burslem Town Council, and later became a clerk in the Gas Office at Stoke-on-Trent. He then moved to Lymm, near Warrington, as Manager of the gas-works there, but returned to the Potteries as Manager of the Fenton Gas-Works, where he remained for fifteen years. During his occupancy of that position, the Potteries towns were federated. On the death in 1914 of Mr. Edward Jones, Manager of the Burslem Gas-Works, at Longport, Mr. Surtees succeeded him, and was also appointed Deputy Gas Engineer of Stoke-on-Trent. About three weeks ago he went to Bournemouth, and soon after his arrival there was taken ill. He was removed to a nursing home, where he died on Tuesday morning. Sympathy is extended to the widow, son, and three daughters in their bereavement. The son (Mr. Gilbert Surtees) is Gas Manager at Uttoxeter.

HERMANN L. SHEPPARD.

It is with much regret that we have to announce the death of Mr. Hermann Leonard Sheppard, which took place on Monday, June 6, at the Cottage Hospital, Wood Green. Mr. Sheppard, who was only 41 years of age, was taken ill on the previous Thursday; pneumonia supervened, and the end came peacefully from heart failure. Deep sympathy is felt for Mrs. Sheppard. There are no children.

Mr. Sheppard was a Director of Messrs. G. Hands & Co., Ltd., Lighting Specialists, of Farringdon Road, E.C. 1; and he was well known in masonic circles through his active connection with the Evening Star Lodge No. 1719, of which he became a member in the year 1913, and was Worshipful Master in 1925-26. He also belonged to the Evening Star Chapter. At the celebration of the coming-of-age of the Northern Star Lodge No. 3053, which was held in Manchester on Nov. 4, 1925, it will be remembered that W.Bro. Sheppard, as W.M. of the elder sister lodge, ably headed a deputation of officers and members conveying congratulations. He was at the time of his death engaged as a member of the Committee having in hand the arrangements for fittingly celebrating the jubilee of his mother lodge, to take place next October. His unbounded energy and kindly readiness to help at all times in any good work will always remain a cherished memory of all who enjoyed the privilege of his friendship.

The funeral took place on Friday afternoon at the Great Northern Cemetery, New Southgate, the service in the church there being impressively conducted by the Rev. W. J. R. Petherick, of Dover. A large number of friends were present, and there were many floral tokens. The widow, the aged father of the deceased—W.Bro. Fred H. Sheppard, P.P.G.D.C. (Hants) Yarborough Lodge No. 551—with his sons and other relatives followed the cortege.

The Evening Star Lodge was represented by its Worshipful Master W.Bro. F. G. Cockey; W.Bro. A. L. Croager, S.W.; W.Bro. A. E. Croager, P.M., P.P.G.D., Kent, Treasurer; Past-Masters A. E. Broadberry, L.R., W. T. Dunn, L.R., A. C. Beal, and Charles Clare; and other brethren. Representing the Evening Star Chapter were the M.E.Z. Ex Comp. Charles Clare; Ex Comp. W. McDowall, J.; Ex Comp. Alfred Beal, Scribe E.; Ex Comp. George Hands, P.Z.; and other companions.

After the committal sentences had been pronounced by Bro. the Rev. W. J. R. Petherick, he delivered a short oration to the brethren, which was listened to with the closest attention, and was greatly appreciated.

Mr. Lancelot T. Penman, a Director of the Newcastle and Gateshead Gas Company, left estate of the gross value of £225,965.

ELECTRICITY SUPPLY MEMORANDA.

THE members of the Incorporated Municipal Electrical Association have been meeting at Buxton, and an excellent programme engaged their attention. The topics ranged from the capital costs of distribution over an extensive area, by Mr. W. C. Bexon, Chief Engineer of the Ayrshire Electricity Board, recent developments in power plant design and their effects on the economy of generation, by Mr. T. Roles, City Electrical Engineer of Bradford, to electrified homes, with special reference to the heating question, by Mr. H. H. Berry. The President was Mr. R. W. L. Phillips, the Engineer and Manager of the Bedford Corporation Electricity Department. The chief theme of his address was based upon the report of the Advisory Committee appointed by the Electricity Commissioners to consider the subject of domestic supplies of electricity, together with the question of tariffs. With the coming of the Electricity Supply Act of 1926, the President believes that all concerned in the industry are convinced that the development of domestic supply is of great importance. He thinks it is true to say that consumers are being connected to the mains at the present time at a greater rate than has been known before. But the new connections mostly represent residents in the smaller types of houses; and they cost practically the same to connect as the larger ones. Though they cost practically the same, they produce much less revenue, and naturally this must progressively have some effect on the financial situation of an undertaking. The President also points out that an obstacle to the progress of domestic electrification is the high resistance to change that is met with in the British household. A high resistance has usually some cause—not merely traditional, but something deeper. It is the need for every householder who is not blessed with an inordinate amount of this world's goods to count the cost of making a change, and of running the new plan in comparison with the present method. When the householder considers these things in relation to initial and annual expense, he has great difficulty in seeing any just cause or reason why he should involve himself in an alteration, the results of which will not enhance economy, efficiency, reliability, or convenience in his household. Mr. Phillips, however, has a practical mind, which cannot be said of some of the writers in the electrical papers, who seem to be of opinion that it is only necessary to say "Do this;" and it will be done. He quietly ridicules the view of the daily papers that the passing of the 1926 Act will render possible a cheap supply of electricity in all areas. In some districts, as Mr. Phillips rightly points out, it is difficult to find revenue sufficient to warrant capital expenditure on the mains required, so that, even at the moderate tariffs existing, and even if electricity cost nothing to generate, the business is found impracticable. It is evident to him that this fact was well to the fore during the deliberations of the Advisory Committee, as a number of their recommendations are directed to reducing the cost of transmitting and distributing lines.

The Need and Difficulties.

A Question of Tariffs.

It will be remembered that the Advisory Committee had submitted to them the consideration of a suitable domestic tariff for general adoption. The President naturally regards this as a most important matter; and, in his opinion, it is full time the industry made up its mind as to what it really wants in this respect. The Advisory Committee were favourable to the two-part tariff; but, as a result of their examination of the tariffs in existence, they failed to discover any new suggestion for a scientific mode of assessing the primary fixed charge which would have some relation to the cost of providing for the electrical service of any consumer. If anything, the Committee evinced a leaning towards the adoption of floor area as a possible basis. There is nothing novel in this; but what has floor area to do with electricity supply, when the requirements of the tenant of a house with a large floor area may not be anything like so great as those of the tenant of a house with a small floor area? One cannot measure individual needs for electricity by any such condition as the superficial area of floors. It would be just as rational to utilize the floor area as showing the hot water service required by a family. There are so many factors—such as size of family, use of rooms, personal ideas, individual fancies in cooking and heating, and so forth, as well as the general arrangement and position of the house. All these and other circumstances come in to vitiate any equitable utilization of floor area as a foundation for the primary charge. Another point in the report to which the President directs attention is that the Committee suggested that any alternative flat rate must be high. In other words, their view is that, to enforce the two-part tariff (which admittedly has its advantages as an inducement to the development of consumption), consumers who prefer to continue on the flat rate should be penalized. The suggestion that any alternative flat rate must be high led the President to make the remark that he does not think it is always realized that this should refer to heating as well as to lighting. He explains what he means by saying that it is no use offering a two-part tariff to replace (say) a lighting rate of 6d. and a heating rate of 1d., unless the unit charge of the two-part tariff is less than 1d. Otherwise, there will be no inducement to increase the use of apparatus already operating on the 1d. rate. The raising of both the charges merely to introduce an alternative tariff would create suspicion in the minds of consumers, which would be difficult to allay, and which would militate against the new tariff. In his view, it would be of immense benefit to the whole industry if one system of charging could be adopted; and the benefit would be increased enormously if a unit charge could be standardized—leaving each undertaking to determine the fixed-charge factor according to the cost obtaining in the district.

Ten for a Penny.

Recently there have appeared in some of the daily papers accounts of the inspection by Press representatives of a plant which is stated to be capable of producing electricity at the rate of 10 units for a penny. The exhibition has been in the Sussex village of Heathfield. We rather suspect—though we cannot definitely say it is so—that this proposal has something to do with a fairly frequent reference in prospectuses emanating from 43, Cannon Street, which vaguely hinted at the existence of some process for which an option was held, and which would be capable of generating electricity at a figure which has not even been dreamed of by our most advanced electrical engineers. But the existence of this process has not saved certain electrical ventures from entering the state of liquidation with the sacrifice of capital. Another point is that, if there is any plant which ensures generation of electricity at the rate of 10 units for a penny, it would be well for the Government to acknowledge that science has defeated their ambitious project, and for them to dissolve at once the Central Electricity Board and the Electricity Commissioners, and let the country have the advantage of such miraculously cheap electricity generation. "Meteor" of the "Electrical Times" is very angry over the matter. He says that a lot of harm is being done by allowing reporters to talk of electricity at 0·1d. per unit. He also says that the system was criticized by him some time ago; it was also commented upon in our columns. It was then found by "Meteor" to be ridiculous, and nothing has happened since to change his mind. He describes the statements concerning the process as wild, misleading extravagancies, which lead the public to regard present electricity undertakings as either wallowing in ignorance, or exultant with avarice. The system is said to be an invention of the late Dr. Reid, an analytical chemist, who was associated with the firm of Brunner, Mond, & Co. If there had been anything in the invention, we undertake to say that Brunner, Mond, & Co. would not have allowed it to slip through their hands. The system professes to use coke mixed with limestone, in the ratio of 2½ cwt. of coke to 1 ton of limestone. The coke-limestone mixture is burned in an apparatus of the form of an ordinary lime kiln. The carbon dioxide resulting from the burning of the limestone is passed through a glowing mass of ordinary coke, with the result that gas containing 25 to 30 p.ct. of carbon monoxide is produced. The gas is used in an engine, which generates the electricity at the stated price of 0·1d. per unit. The newspaper reports go farther, and say that the 0·1d. is the selling price in bulk. We publish this information for what it is worth; and our estimate is that it is not worth much. However, it is information which was given to the newspaper reporters who visited "the simple generating plant in the quiet Sussex village of Heathfield." From this we gather that they were simple visitors to a simple plant, situated in a simple environment of rural life.

The Recent Ballot.

In the "JOURNAL" last week, a brief announcement was made of the fact that Miss E. Gardiner, of Bristol, was the winner of the first prize in the ballot which was one of the features of the "Wiring of British Homes Campaign." The prize was to be a well-designed "all-electric" house, or a cheque for £2000. Miss Gardiner prefers the cheque, and she is well advised. If she wishes, there is nothing to prevent her building, with the money, a house "all-gas" fitted, although in a letter she says that at any future day, should she have a home of her own, she will certainly avail herself of all the advantages afforded by electricity. But that does not bind her to any agreement not to use any other agent which has superior claims for certain purposes to electricity. It appears that some 150,000 people entered the ballot out of the 40,000,000 odd representing the population. We learn that the result of the voting upon the twelve "merits" was as follows:

No.	Votes.	No.	Votes.
11.—Convenient	44,787	1.—Reliable	5,744
12.—Clean	28,299	2.—Simple to control	5,132
3.—Saves work	26,345	4.—Preserves the sight	2,841
8.—Economical	16,949	7.—Fumeless	2,841
9.—Safe	7,502	5.—Cheerful	1,762
6.—Adaptable	6,218	10.—Artistic	943

It will be noted that the voting has shifted considerably the

original numbers of the "merits." The greatest number of votes were recorded for convenience; cleanliness came next; that electricity saves work was third; only 16,949 were prepared to assert that electricity is economical; safety gained only 7502 votes; reliability was worse still with 5744 votes; that electricity preserves the sight was only subscribed to by 2841 votes. The absurd inclusion of "fumeless" only gained the same number of votes. "Cheerfulness" of electricity and its "artistic quality" came very low in the poll. We should imagine that some of the voters had not had the best of experience in such matters as safety, reliability, simplicity of control, and other matters.

Machined Cooking Utensils.

With the so-called high-efficiency electric boiling-plates of the completely enclosed type, to which attention is being directed at the present time, it seems that, to get the best effect, it is necessary that the utensils used on them should have machined bottoms. "Cuisinier," writing from Newcastle-upon-Tyne, suggests that authorities hiring-out cookers fitted with boiling-plates of the kind mentioned should, instead of the usual electric kettle, supply (say) four utensils—a kettle, frying-pan, and two saucepans—all of the best quality, with machined bottoms. He states that, provided the utensil has a perfectly flat bottom, these plates will boil water faster than an electric kettle of the usual loading, and the increased consumption will be easily countered by the increased efficiency of boiling operations with the other pans supplied. His belief is that this would give greater satisfaction to the user, who naturally does not want to buy special utensils when having a cooker fitted. Moreover, the supply authority would cut-out what "Cuisinier" confesses is the "high" maintenance cost of electric kettles. He also suggests that the saucepans could advantageously be of the square type—thus, in his view, increasing the boiling facilities. The provision of special utensils to meet the requirements of the boiling-plates would add to the capital cost, and would necessitate a greater hiring charge, so that the consumer would pay in this way, if he did not himself purchase the utensils outright.

Sale of Fittings, and a Committee.

Clause 48 of the Electricity Supply Act, 1926, permits local and other authorities to engage in the sale of electric lines, fittings, &c. The third sub-section provides that the Electricity Commissioners shall appoint a Committee, comprising members of associations representing local authorities who are authorized undertakers, contractors, and persons engaged in the business of making or selling electric fittings, to determine any question which may be raised under the section as to the recognized retail or trade prices of any electric fittings, and shall advise and assist persons concerned as to the method of giving effect to the provisions of the section. The Commissioners, in pursuance of this provision, have appointed a Committee, with Mr. D. N. Dunlop as Chairman. The members comprise representatives of the Incorporated Municipal Electrical Association, the British Electrical and Allied Manufacturers' Association, the Electric Light Fixtures Association, the Electrical Accessories Manufacturers' Association, the Electric Lamp Manufacturers' Association, the Cable Makers' Association, the Electrical Wholesalers' Federation, the Electrical Contractors' Association, and the Electrical Contractors' Association of Scotland. This representation certainly ought to be adequate to the protection of all interests.

In the United States.

It is stated that during 1926 the electricity consumption in the United States increased by 12 p.ct. The total output was 73,791,064,000 KW.H. Of this total 64·5 p.ct. was generated by fuel; the remaining 35·5 p.ct. being produced by water power. The ratio of production by fuel and water power in 1925 was 66·1 to 33·9 p.ct. The fuel used last year was 43,310,828 short tons of coal—an increase of 2·7 p.ct. over the coal consumption of 1925. The oil consumption is estimated at 9,399,222 barrels—a decrease of 8·3 p.ct. The natural gas consumption reached a total of 53,207,144,000 c.ft., which is 4·4 p.ct. greater than in 1925.

North British Association of Gas Managers.—The annual general meeting of the Association will be held in Dumfries on Sept. 7, 8, and 9.

Imperial Continental Gas Association.—From June 18, the London Offices of the Association will be transferred to 2, Devonshire Square, E.C. 2. The telegraphic address will be "Imcongas, Ave., London;" the telephone numbers will be unchanged.

Food and Cookery Exhibition.—The thirtieth annual exhibition held by the Food and Cookery Association will take place at the Holland Park Hall from Nov. 15 to 24, and the Westminster Advertising Service, Ltd., of Addison House, 26, Bedford Street, London, W.C. 2, to whom all inquiries should be sent, have been appointed sole publicity, advertising, and letting agents.

KINGSTON-UPON-THAMES GAS COMPANY.

Mr. H. W. Packham appointed Managing Director.

The seat on the Board of the Kingston-upon-Thames Gas Company which became vacant by the death of Mr. E. T. Coppinger, J.P., has been filled by the election of Mr. H. W. Packham as a Director, with the appointment of Managing Director.

Mr. Packham joined the Company in 1888, was appointed Assistant Manager in 1900, and Engineer and Manager in 1903, succeeding his father, the late Mr. H. F. Packham. During his service the now Managing Director has seen the output of gas by the Company increase from 240 million c.ft. in 1888 to 480 millions in 1903, and to over 990 millions in 1926; this increase naturally being accompanied by many alterations and additions to works and plant. The employees of the Company have expressed their congratulations to Mr. Packham in an address bearing over 300 signatures, thus supplementing in a pleasing manner the recent presentations of a silver salver and cigar and cigarette cabinet to their Chief.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

June 24.—WAVERLEY ASSOCIATION OF GAS MANAGERS.—Annual meeting in Edinburgh.

July 12.—NATIONAL GAS COUNCIL.—Annual meeting at the Hotel Cecil, at 3.15.

July 12.—FEDERATION OF GAS EMPLOYERS.

Sept. 7-9.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Annual general meeting in Dumfries.

Sept. 23.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Visit to the Torquay Works of the Torquay and Paignton Gas Company.

Oct. 3-5.—BRITISH COMMERCIAL GAS ASSOCIATION.—Sixteenth annual general meeting and conference at Southampton.

INSTITUTION OF GAS ENGINEERS.

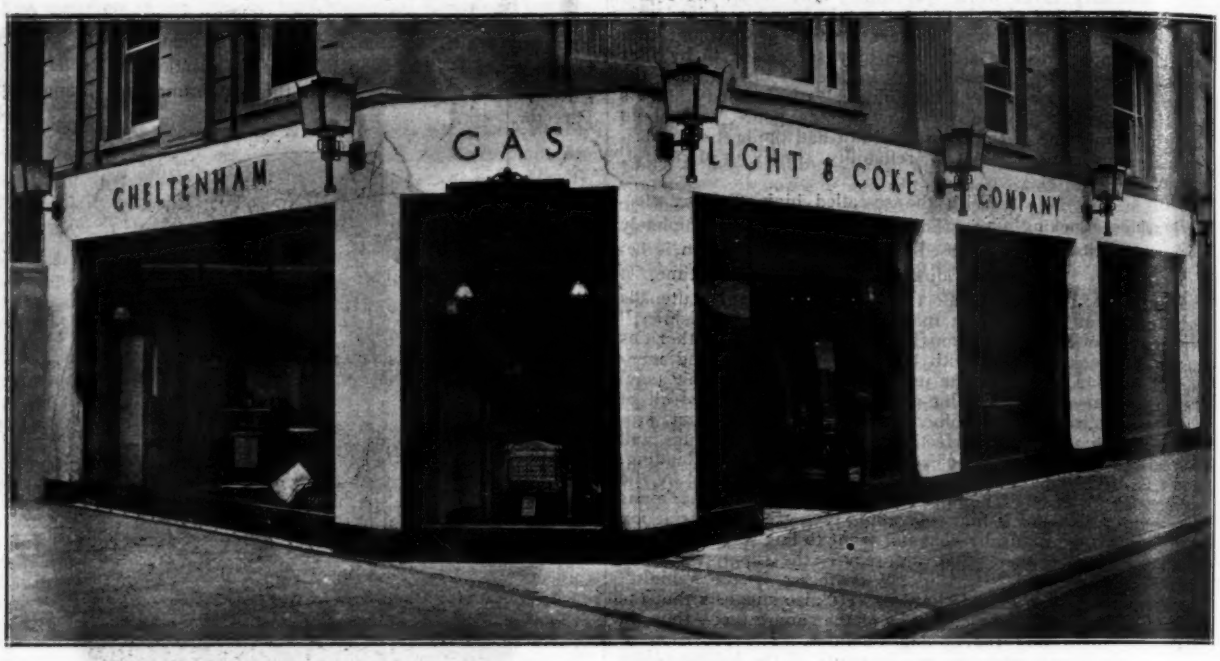
July 11.—Emergency Committee.
Finance Committee.

July 12.—Gas Education Committee.

We have been informed by a correspondent that a house-to-house canvasser is calling on houses in the Acton district, offering a useless metal cooking device purporting to save gas, and stating that he is from the Gas Company and from Radiation Ltd.

Mr. Punch's "Summer Number 1927," which has twelve pages in colour, is as full of gaiety and good-humour as usual. Politics, golf, cricket, seaside garb, and much else have place in this happy and clever medley; and no one will have a glum face with this diverting shillingsworth in hand.

NEW SHOWROOMS AT CHELTENHAM.



THE FRONTAGE IS OF SICILIAN MARBLE, RELIEVED BY BLACK NAPOLEON MARBLE.
(Architects: L. W. Barnard & Partners.)

The Cheltenham Gas Light and Coke Company have opened new branch showrooms in the principal thoroughfare—the Promenade—on a prominent corner site. The frontage of the new premises—which, from photographs forwarded by Mr. C. W. Welford, the Accountant and General Manager, we illustrate here—is carried out in Sicilian marble relieved by Napoleon (black) marble, with bronze window-frames, lamps, &c.

The interior woodwork is of polished mahogany, and the mantelpieces (also of mahogany) are fitted with marble surrounds, hearths, and kerbs.

Special attention has been given to ventilation; and in addition to a large central flue, around which gas fires are shown, "Nautilus" flue-blocks have been inserted at various points in the walls. All appliances are shown in actual use and in appropriate settings. A lavatory basin, a bath with white marble surround, and other adjuncts to the demonstration of hot water appliances are fitted.

Institution "Transactions," 1925-26.

Including the lists of members, &c., at the end, the volume of "Transactions" of the Institution of Gas Engineers for the year 1925-26—a copy of which we have received from Mr. Walter T. Dunn, M.I.Mech.E., F.C.I.S., the Secretary—contains nearly 850 pages, which is a substantial increase over preceding issues. It records the proceedings of the Institution during a period of great difficulty, when, it will be recalled, circumstances compelled the postponement from June to September of the annual meeting, which naturally constitutes the main feature of the volume, for the editing of which Mr. Dunn is again responsible. Mr. Charles F. Botley, M.Inst.C.E., of Hastings, was the President for the year; and an excellent portrait of him forms a frontispiece to the book. In addition to the papers and discussions at the meeting, there is a report of the Institution's session at the Public Works, Roads, and Transport Congress, held at the Agricultural Hall, in November, 1925, when papers were read by Mr. C. S. Shapley and Mr. George Evetts. There is the thesis submitted in connection with the Institution's 1926 Diploma Examination in Gas Engineering—that by Mr. Stewart L. Wright, of Birkenhead, on "The Use of External Producers for Heating Retort Settings"—and Mr. A. V. Hendrickson has prepared abstracts of various papers, &c., of value relating to gas manufacture. The memoirs with which the volume closes record the loss of a Past President, Mr. Daniel Irving; and of Mr. Sydney Y. Shoubridge, who was for some years Honorary Secretary of the Institution.

NEW SHOWROOMS OF THE HEXHAM GAS COMPANY.

The latest addition to the business premises of Hexham is a handsome and commodious showroom, with offices adjoining, which the Hexham Gas Company have just completed at the Market Place end of Fore Street. "The outside appearance of the showroom is impressive," states a local paper, "and internally it is all that the most fastidious shopper could wish."

The new shop front is of teak with a granite base. The showroom consists of a hall, 40 ft. by 30 ft., the floor of which is laid with "Terrazzo." The walls have a panelled dado; the upper portion and the ceilings being finished in fibrous plaster. The work has been carried out from the design and under the superintendence of Messrs. J. Walter Hanson & Son, Architects, of Newcastle and Hexham.

The gas and ventilating flues are constructed of "Everite" asbestos piping, taken up through the existing building and roof. The show windows have ventilating panels in the base, and large hit-and-miss ventilators at ceiling level. Water and gas are conveyed to traps in various positions in the floor for demonstration purposes.

The lighting of the showroom and directors' room is by means of Sugg's "Bon Marché" pendants; and the "Directive" burner, by the same makers, has been adopted for window lighting. All lamps are controlled by switches placed in convenient positions. Provision is also made for three outside lamps, each of about 600 C.P.

The display in the showroom affords evidence of the many uses to which gas is applied. There are, of course, cooking stoves of various designs, fires, of which the "Sunbeam" is more particularly displayed, circulators, geysers, a wide variety of pendants and brackets, some of them most beautiful in design, and various other labour-saving appliances for the workshop and home which modern gas science has made available. The new showroom is a tribute to the enterprise of the Hexham Gas Company, and should result in a marked increase in business.

NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.

AUXILIARY SECTION MEETING.

Two papers were read at this meeting. Mr. L. M. Weldon, of the Hartlepool Gas and Water Company, outlined the sales methods of his undertaking, which is one of medium size. He mentioned that the Company had had a showroom for forty years—which fact indicates the importance which they attach to sales organization and development. Mr. C. C. Markham, of the Newcastle-upon-Tyne and Gateshead Gas Company, gave a highly informative paper entitled "Reinforced Concrete Construction"—a happy combination of theory and practice.

The Fifteenth Half-Yearly Auxiliary Meeting of the North of England Gas Managers' Association was held at the office of the Newcastle and Gateshead Gas Company, Grainger Street, Newcastle-upon-Tyne, on Saturday last—Mr. C. G. BARRETT (Assistant Engineer and Manager of the Hartlepool Gas and Water Company) presiding.

The CHAIRMAN moved, and Mr. H. GREIG (Sunderland) seconded, that Mr. T. F. Barrow (District Superintendent of the Sunderland Gas Company) be elected Chairman for the ensuing year, and Mr. J. A. Dixon (Elswick Works of the Newcastle and Gateshead Gas Company) and Mr. G. W. Martin (Houghton-le-Spring) members of the Committee.

The following papers were then read.

REINFORCED CONCRETE CONSTRUCTION.

By C. C. MARKHAM, A.M.Inst.C.E., Chief Draughtsman to the Newcastle and Gateshead Gas Company.

It is well known that concrete has a high coefficient of resistance to compression, and that its resistance to tensile and shearing stresses is low and unreliable. Iron and steel have a good resistance to compression, tensile, and shearing stresses; and therefore it is natural that an effort should be made to blend these materials so that the strength of the one should be made to overcome the weakness of the other—in other words, to use concrete for the compression stresses and to meet the tensile and shearing stresses by the use of steel. Such, briefly, is the principle of reinforced concrete.

This form of building construction has met with considerable application during the past thirty years, and has therefore come to be considered as a modern building material. The principle, however, is old, having been practised by the Romans, but it remained unexplored until the modern manufacture of portland cement made the use of concrete extensive. The ease with which the material can be procured and transported, the adaptability of its construction to any form, its comparative cheapness, and its great strength to resist compressive stresses, render its use of extreme value in modern engineering and other constructional works.

It is interesting to recall that Wilkinson—a plasterer of Newcastle-on-Tyne—took out a patent in 1855 for reinforcing concrete slabs by a network of iron rods. His floors were either flat or of arch form; and from the disposition of the reinforcement it is evident that he understood the modern principles of reinforced concrete.

From about the same date French engineers and constructors were quick to perceive the possibilities of reinforced concrete construction; and the progress of this class of work in France was considerably advanced by the Government of that country, which established, some 35 years ago, a separate department of the Ministry of Public Works for research and advancement of reinforced concrete, or "armoured concrete," as it is known there.

It followed therefore that considerable progress in all classes of reinforced concrete construction was being made in that country, on the Continent of Europe generally, and in America, while little or nothing of the kind was being attempted here. We find the principal Continental cities regulating reinforced concrete structures in their building codes.

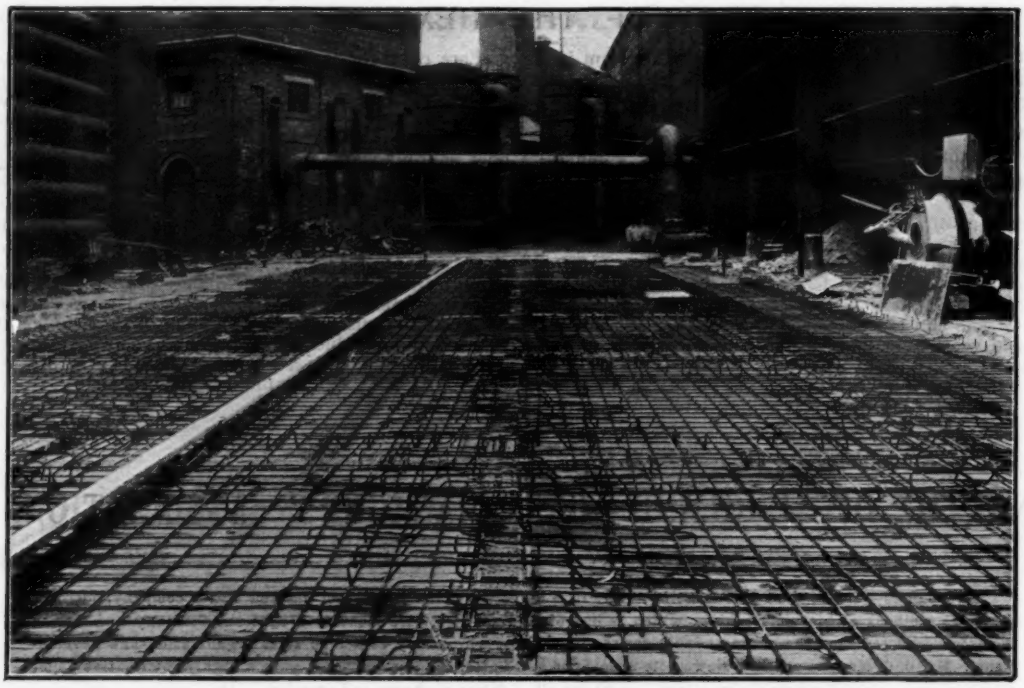
PROGRESS IN ENGLAND.

It was not, however, until July, 1915, that the London County Council, under the L.C.C. (General Powers) Act, 1909, made "Regulations with respect to the construction of buildings wholly or partly of reinforced concrete, and with respect to the use and composition of reinforced concrete in such construction."

In the meantime there had arrived here from abroad, and especially from France, many patented or other systems of reinforced concrete construction which were extensively advertised, and secured the construction of many large and important undertakings. Sufficient interest was thereby aroused to cause our technical corporations to take notice, and in consequence to form commissions of inquiry and to issue reports. Thus the R.I.B.A. issued its first report in 1907, and its second report in 1911. The Institution of Civil Engineers issued its preliminary report in June, 1910, and its second report in 1913. The latter appears to be mainly inconclusive, but with the concurrence of the Committee, and with certain reservations, decided "that the rules of calculation which were set forth in the second report of the Committee of the Royal Institute of British Architects, 1911, may be, so far as definite and reliable information is at present available, applied with confidence by engineers."

The issue of the L.C.C. regulations above noted appears to be the date when it may be said that this country officially adopted reinforced concrete construction. This is a matter of some importance, since it helps to dispose of a number of questions which were being continually asked as to the behaviour of reinforced concrete. Questions such as, Will it last? What happens to the steel? Will it rust? What is the effect of variations of temperature? Is there good adhesion between the steel and the concrete? What are the effects of shock and rolling loads? &c. As a matter of fact, many thousands of buildings had been erected in reinforced concrete, and large and small tests made by engineers, long before these regulations were issued. A literature had come into existence dealing with this subject alone. All this information was available when the L.C.C. regulations were made; and it may therefore be taken that favourable answers were received to all the foregoing questions, and also to a great many more points both theoretical and practical.

Reference to the regulations saves us to-day a great amount of trouble. They serve as a useful check on any system, and enable the engineer or architect to approach the subject with confidence. Ten years is a considerable period in a rapidly moving science like reinforced concrete; and no doubt these regulations, to the experienced specialist, may appear too conservative. With this information so easily accessible, there is therefore scarcely any necessity for us to examine in detail any of the seventy or so specialized or patented systems that have been, or still are, before the public. Those systems which use ordinary commercial sections as rolled in this country are those which appear likely to prove the most successful. Other systems employ deformed bars relying upon a superior adhesion



WORK BEGUN ON PURIFIERS AT THE ELSWICK GAS-WORKS (CONTRACTORS, PETER LIND & CO.).

between steel and concrete; others use high-tensile steel, and produce evidence of consequent economy of construction. In general it may be said that in practice it is found that work designed to use ordinary round mild steel bars as rolled by British steel makers is able to compete successfully from every point of view with any patented or other system employing special steel, and, furthermore, is to be preferred.

Reinforced concrete has been applied in gas-works engineering practice to the construction of river works, railway approaches, foundations, bunkers, tanks, purifiers, and in general building construction. It is a material which is eminently suitable for all classes of engineering and architectural work. Points in favour of its use are strength, durability, ability to resist shocks and vibration, fire-resisting properties, saving of space, and economy of upkeep. It is economical in first cost, and can be rapidly executed.

MATERIALS COMPOSING CONCRETE.

Considering now the materials of which reinforced concrete is composed, we may usefully look at the improvements in cement which have taken place during recent years. The issue of the first British standard specification in 1904 was valuable to consumer and manufacturer alike, since the standardization of quality enabled manufacturers to concentrate upon a uniform standard of product. The tensile strength of 3 to 1 specimens was then 120 lbs. per sq. in. at 7 days. Following the issue of the 1925 B.S.S., it is now 325 lbs. per sq. in., with a residue of not more than 10 p.ct. on the 180 by 180 mesh sieve —*i.e.*, 32,400 holes per sq. in. This fineness of grinding gives higher results in tensile and compressive stresses, freedom from unsoundness, and increase in sand carrying capacity. With the absence of free lime there is no necessity for the old-time practice of aerating the cement.

RAPID-HARDENING CEMENTS.

The production of rapid-hardening cements is an important feature of recent developments. Rapid-hardening portland cement will give a tensile strength of 600 lbs. per sq. in. on 3

THE COLUMNS AND WALLS UNDER CONSTRUCTION.

to 1 specimens at 7 days. The following table, taken from No. 1, Vol. XXI., of the issue of "Concrete and Constructional Engineering," shows the advantage in compressive strength of rapid-hardening cement over ordinary portland cement.

1 Part Cement, 2 Parts Sand, 4 Parts Ballast. Water, 6 P.Ct.

—	24 Hours.	2 Days.	3 Days.	5 Days.	7 Days.	28 Days.
Ordinary	450	1060	1890	2270	2860	4440
Rapid hardening. .	1750	2190	3853	4840	5360	6810

The potentialities of this material are great, and as time goes on will reflect themselves in the economical side of structures where speed of construction involves special consideration, and when local authorities have become convinced that this stronger material will permit of higher working stresses. Reinforced concrete requires a slow setting portland cement; and it may be noted that rapid-hardening portland cement has not quick initial setting, and allows ample time for mixing and placing the cement in position before the set commences.

Sand.—It is important that this shall be clean, sharp, and silicious, with grains of approximately $\frac{1}{16}$ in. downwards.

Aggregate.—Hardness, size, and cleanliness are the most important properties. Clean ballast or gravel, broken hard rock such as granite, basalt, and whinstone broken brick may be used in certain cases. On the work at the Redheugh Gas-Works to be described below, good concrete was made from broken firebrick from old retorts. Coke breeze, clinkers, and slag are unsuitable, also limestone, if fire resistance is desired. The size of aggregate should be such that it will pass through a mesh of $\frac{3}{4}$ in. square, and be retained on a mesh $\frac{1}{16}$ in. square.

Water.—This should be clean. The mixture should be plastic enough to be readily poured and placed in position with light metal rammers all round the reinforcement.

Steel.—Mild steel manufactured by the basic open hearth or acid Siemens process, giving 28 to 33 tons in tensile stress, 20 p.ct. elongation in 8 in., and 40 p.ct. reduction at point of fracture, and generally complying with the British standard specification for structural steel, used in the form of round bars from $\frac{1}{8}$ in. diameter upwards, is suitable.

Concrete.—For general purposes 4 parts aggregate, 2 parts sand, and 1 part cement will give a satisfactory mixture. Machine mixing is to be preferred. If not available, then the sand aggregate and cement must be thoroughly well incorported before adding water, and 10 p.ct. more cement should be added.

Formwork or Centering.—This should be of substantial thickness to obtain rigidity during the placing of the concrete. A minimum thickness of $1\frac{1}{2}$ in. for general floor beam and pillar construction, which should be amply stayed so that every section is unyielding. Sufficient time must be allowed for the setting of the concrete, and the centering must be withdrawn gradually and carefully. Timber centering when re-used should be treated inside with a suitable oil or be lime washed, so that when stripped the concrete surface is left clean. On large works involving considerable reproduction of similar sections, economy may be obtained by using metal centering, which may be hired or purchased. Economy can also be secured by the use of pre-cast members.

THEORY.

Taking a rectangular bar of ordinary concrete subject to tension and showing at rupture an elongation of $\frac{1}{16}$ in., a similar bar when reinforced will show an elongation of 1 in.—*i.e.*, ten times greater—before signs of crack. It is evident from this that we have to deal with a distinct material, and the laws and methods of calculation applying to homogeneous materials are not of assistance except in so far as they may relate to the determination of amounts of stresses and reactions due to loads.

Ordinary good concrete composed of 1 part cement, 2 parts sand, and 4 parts coarse material should have at least an ultimate compressive strength of 1600 lbs. per sq. in. at one month, and 2400 lbs. per sq. in. at four months. Using a factor of safety of 4, we get a working stress for the concrete of 600 lbs. per sq. in. Steel of the quality above specified will have an ultimate tensile strength of 64,000 lbs. per sq. in. A factor of safety of 4 thus gives us 16,000 lbs. per sq. in. as a working stress for the steel.

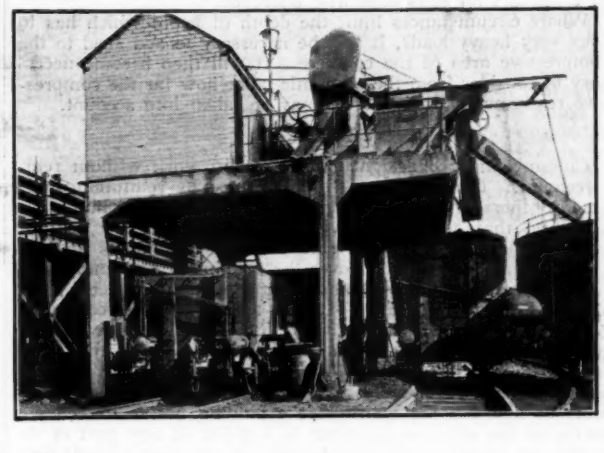
The coefficient of elasticity of steel is 30,000,000 lbs. per sq. in., that of concrete 2,000,000 lbs. per sq. in. This gives us a modulus of 15.

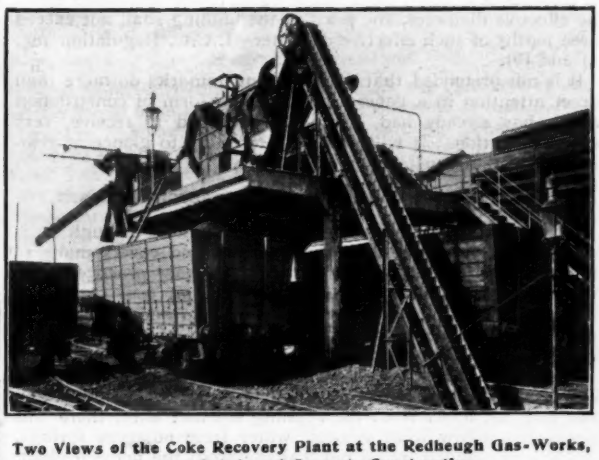
Safe shearing stress may be taken at 60 lbs. per sq. in. and adhesion between concrete and steel at 100 lbs. per sq. in.

It was stated at the beginning of this paper that reinforced concrete design consists of using concrete for the compressive stresses and steel for tensile and shearing stresses. Simple slabs and beams are therefore provided with reinforcement generally in the form of bars, or it may be expanded metal or some form of woven mesh material, on the lower or bottom side of the slab or beam. Extending this principle to more varied and larger forms of construction, the disposition of the steel will be varied to meet the several conditions of strain set up by the several factors of the loads due to the construction under consideration. Thus the slabs and beams may be (*a*) fixed at one end or at both ends, (*b*) continuous over many supports, (*c*) fixed at one end and supported at the other, (*d*) in the form of cantilevers.

It can be proved that, in an ordinary simple reinforced concrete beam or slab subject to bending stress, the economic amount of steel required to give the necessary resistance to tension will be 0·675 p.ct. of the sectional area of the beam. The position of the neutral axis in such beam or slab will be found to be 0·36 *d*, where *d* is the distance from the top surface of the beam to the centre of the steel reinforcement.

The maximum bending moment due to loads will equal the moment of resistance of the beam, and this resistance moment or lever-arm will equal the distance between the centre of the area of compression (the area above the neutral axis) and the





Two Views of the Coke Recovery Plant at the Redheugh Gas-Works, showing Reinforced Concrete Construction.

centre of the steel reinforcement. Thus it will be seen how the strength of a beam will vary according to the width, the depth, and the amount of reinforcement provided.

In the foregoing no mention is made of any value the concrete may have in tension. In practice its value is neglected, and the steel is designed to take the whole of the tension.

It will now be readily understood that if we construct a beam having a wide flange, in order to get the utmost value out of the compressive strength of the concrete, we can group the steel in the form of a rib. This consideration accounts for the tee-beam, which is the form most frequently met with in reinforced concrete construction, and which, being so economical, contributes largely to the success of reinforced concrete construction.

The width of slab that can be calculated as the flange of the tee-beam is limited by Regulation 82 of the L.C.C. It must not exceed:

(*a*) One-fourth of the effective span of the tee-beam.
(*b*) The distance between the centres of the ribs of the beams.
(*c*) Twelve times the thickness of the slab, whichever is the least.

Where perfect freedom of design may exist, it will be possible to design beams with tension bars only, which will contain sufficient resistance to shear. This can only occur very rarely in practice, so that consideration of strengthening the web of the beam against shear becomes necessary. The

amount of shearing stresses will be the same as for homogeneous beams for the varied conditions of loading. The tension planes of shear in a reinforced concrete beam are at an angle of 45° with the horizontal, and the steel reinforcement must be designed to cut through these planes. This is usually done by cranking the tension bars, and by the addition of links or stirrups at suitable intervals.

The safe shearing stress of concrete is 60 lbs. per sq. in., so that the sectional area of the beam multiplied by 60 will give the safe shear in pounds across the beam. If on further investigation it is found that the area of concrete is insufficient, the whole shear must be taken by the steel. The L.C.C. Regulation 67A specifies that the shear or web reinforcement shall be spaced according to the intensity of the shearing stresses, but that the distance from centre to centre of the shear or web members at any part of the beam shall not exceed a length equal to the area of the resistance moment.

Adhesion.—L.C.C. regulations specify the grip length for round or square bars as 40 diameters for hooked ends and 67 diameters for ends otherwise anchored.

Where circumstances limit the depth of beam which has to take very heavy loads, it will be necessary to add steel to the compressive area of the concrete. It will then become necessary to consider from the economic point how far the compressive resistance of the concrete may be taken into account.

Columns.

Columns may be designed to do useful work without reinforcement. The advantages to be gained by reinforcing are, among others, that the column may be reduced to a minimum size, and that adequate provision may be made for flexural stresses, since it is only on rare occasions that loads may be calculated as being central over the columns. The amount of reinforcement necessary should be not less than 1 p.ct. of the area of the " hooped core "—that is to say, the area contained within the outer surface of the vertical bars. Thus it may be readily ascertained that a column 12 in. square reinforced with four 1 in. diameter bars will carry a load of 71,220 lbs., or about 32 tons. Flexibility is secured by the use of horizontal links or binders; the width of the binding not to exceed six tenths of the effective diameter of a pillar at any part of its length, or sixteen times the diameter of the least vertical bar. At the ends of a pillar, for a length equal to one-and-a-half times the effective diameter, the pitch of the binding shall not exceed three tenths of such effective diameter—L.C.C. Regulation 105, (*a*) and (*b*).

It is not pretended that the foregoing remarks do more than direct attention in a general manner to a form of construction which has already had, and is yet destined to receive, very wide application. It will now be interesting to glance at reinforced concrete construction in practice.

Coke Recovery Plant at the Redheugh Works.

This plant is offered as a useful example. Though it is not large, it yet contains varied features, and covers many of the conditions likely to be met with in ordinary practice. The work consisted of (1) the formation of a pit constructed for the reception of ashes emptied out of trucks and built also to receive the elevator boot; (2) the erection of a platform to carry the coke recovery plant.

The site of the work is within a few yards of the River Team, where it is subject to tidal influence. The foundation was bad, as, apart from the running silt met with, there was continuous inflow from sub-soil water from adjacent springs, which was polluted by an old leakage from the benzole plant. The effects of tidal pressure, added to the above, made it impossible to excavate for the pit without the aid of a coffer-dam enclosing the site. The pit has therefore been designed to meet these conditions. The railway is partly carried by rectangular beams across the pit.

The platform is carried on reinforced concrete columns founded on footings. The support to be reckoned on could only be taken at ¼ ton per sq. ft.; hence the formation of the footings. Main beams are carried between the columns, and secondary beams to these carry the slabs. Use is made of tee-beams; and an interesting feature is the cantilever beams and slab.

The slabs are reinforced by bars carried over the supports and cross bars. This work, therefore, comprises (1) beams subject to heavy loads where head room is limited, (2) underground walling subject to outside pressure, (3) foundations both for underground tanks and columns in difficult ground, (4) columns, (5) main and secondary beams, (6) slabs with continuous over-supports and fixed at one end, and (7) cantilever beams and slabs. The whole of this work was done by the staff of the Redheugh Gas-Works.

Finally, I would like to take this opportunity of thanking Mr. F. P. Tarratt, Chief Engineer to the Newcastle and Gateshead Gas Company, for permission to prepare and read this paper.

[The author showed slides of the work referred to, and of other jobs at the Redheugh and Elswick Works, as well as of more extended operations outside gas-works practice.]

Discussion.

Mr. T. H. Bryce (District Engineer, Hennebique Ferro-Concrete Company) opened the discussion, and dealt with the construction of the Berwick Bridge by his firm. Three of the spans, he said, were larger than anything of the kind that had been attempted previously in this country. By the use of hollow ribs, thus lessening the weight, a saving in the cost of the foundations was effected; but there was trouble with the latter owing to a natural fault in the ground of the river bed. The work would be completed by the end of the year, whereas it should have been finished in August; but the extra time taken was due to the trouble with the foundations.

Mr. W. S. Robertshaw said it was not quite clear whether the work at the Redheugh Station was carried out by the Company's own men or let to contract. He also asked whether consideration had been given to mass concrete in tank construction.

Mr. G. E. Anderson (Willington Quay) asked if the cost of reinforced concrete was not due to the amount of timber used for centring, and the fact that the wood could not be employed again.

Mr. O. H. Ingham (South Shields) thought something might have been included in the paper about the man who made the discovery of portland cement. On the question of tests, he desired to know if Mr. Markham had tried the American " slump " test in mixing.

Mr. William Batt (Newcastle) asked if the question had ever been considered of concrete pipes for carrying gas in the same way as the material was used for sewers. What would be the effect of the flow of gas?

Mr. William W. Wills (Newcastle) wished to know if Mr. Markham had had any experience with the new quick-drying concrete.

Mr. Markham, in reply, pointed out that, in connection with the work done at Gateshead, it would have been difficult to get a contract, in view of the troubles they had with the foundations. From the information they obtained, the plans were prepared at the Elswick offices, and the work was carried out by the men at the Redheugh Works. The question of mass concrete was never seriously considered. It would have involved a sacrifice of space they could not afford. One could have mass concrete walls for storage; but it was not in every place that the space could be afforded. This was where the gain of reinforced concrete came in. Metal centrings were used principally by contractors in a large way of business. It would not be economical for small works to have them, because they were not doing the amount of work requisite to secure an economical result. Timber was one of the things which added to the cost of reinforced concrete; but a lot of it was employed over and over again. When the British cement standard came in, it enabled the manufacturers to concentrate on a certain product; whereas before that there was rivalry between them. It was forced on this country from without, in the same way as reinforced concrete had been. Personally he had never used the "slump" test; but no doubt it would become more general. Reinforced pipes had long been made for sewage and water services; but he had not heard of their being applied to gas. They had used a lot of ferro-concrete in the formation of floors to carry buildings over pipes. It cost 10s. a ton more; but they obtained the result by being able to get work away quicker.

GAS SALES DEVELOPMENT IN A MEDIUM-SIZED UNDERTAKING.

By L. M. Weldon, Commercial Assistant, Hartlepool Gas and Water Company, West Hartlepool.

We have had the pleasure at one time or another of listening to interesting papers both from the representatives of the smaller undertakings giving particulars of how, with limited means at their disposal, their gas sales departments are conducted, and from larger undertakings, where facilities for experimenting, and trying new methods and appliances, are almost unlimited. In deciding, therefore, upon the subject of a paper, I thought it might be of interest to the Association to hear what was done in the gas sales development department of an undertaking of medium size, like the Hartlepools.

Works Showroom.

About forty years ago, the Company opened a showroom for the display of gas appliances, being, I believe, one of the first companies in the North to do so. This was situated at the works, about midway between the two Hartlepools, but really in neither one nor the other, and some distance from the centre of either. It served a useful purpose for many years. Only the best makes of lighting fittings were stocked, and the highest grades of cookers and fires. At that time a consumer was required to pay for both labour and materials used in fixing hired apparatus—even the cooker white crown-plate being charged for—and although coal was only about 12s. 6d. per ton, and coke 7s. 6d. per ton, a steady and increasing business was done in cooking and heating appliances. With regard to lighting fittings, speaking generally, the demand was for cheap examples; but as the Company would not, on principle, supply these, our customers were chiefly the better class of consumers. However, this policy was adhered to, and we have all along tried to educate the public to the use of good sound fittings.

Temporary Town Showroom.

At wide intervals we exhibited at trades exhibitions; and the success associated with these spasmodic efforts led us to think that a display for a longer period might be worth trying. In 1901, therefore, in conjunction with a firm of stove manufacturers, a large shop in the principal street of the town was rented for six weeks. A good display of apparatus was arranged; and a large window fitted as a model

kitchen aroused much public interest. The advantage to be derived from prominently exhibiting to the public appliances for the use of gas was soon apparent; and with the assistance of three or four canvassers working the district, in the six weeks over 250 orders were secured for cookers alone—an unprecedented number at that time. The success of this experiment led to its repetition for a number of years, with unvarying success.

PERMANENT TOWN SHOWROOM.

In 1914 it was decided that the time was ripe for a permanent town showroom. Up to then, the sales department was carried on from the works, practically by one person; but the benefits of a well-situated town showroom have been amply proved by the fact that five persons are now fully engaged in following-up showroom orders and inquiries. The total number of cookers and fires ordered during the first year the showroom was opened amounted to 489; whereas in 1925 the number was 3222, and in 1926 it was 2252. The extra number during the preceding year was due to the introduction of free fixing.

ADVERTISING.

Our experience confirms that of so many others—that "it pays to advertise." By advertising, I do not mean an occasional advertisement in the local paper, although that is not to be despised, but refer to the persistent, continued advertising, which the public cannot but notice—the advertisement which meets them when they open their newspapers, ride in tram or bus, go to a football match, read their church magazine, visit a theatre or cinema, or pass a hoarding. Such publicity never fails to be productive of increased business. Every special advertising scheme tried has been successful in creating some additional demand for gas appliances; and the more sustained the effort, the better has been the result.

In this important branch of gas sales development, in addition to the very valuable assistance obtainable through the "B.C.G.A.," useful help is now available from the advertising departments of the stove makers, who are always pleased to supply subject-matter, and the stereos which make a printed advertisement so attractive; and I would also take this opportunity of acknowledging the very ready and valuable assistance that larger undertakings are always willing to give to those undertakings which have not the staff available to deal with this class of work. To evolve and prepare striking and pointed advertisements necessitates considerable thought and time, as well as a natural aptitude for such work. We are glad to have the opportunity of publicly acknowledging the valuable help received in this direction from our good friends at Newcastle.

Our general and regular advertising includes the following:

Illustrated envelopes (for local correspondence and receipts).
Back of gas application forms.
Painted theatre curtains.
Slides at all cinemas.
Several church magazines.
"Chamber of Commerce Journal."
Painted hoardings.
Painted fencing inside Town Football Ground.
Cookery book with every cooker fixed. (By post.)
"1001 Uses for Gas." (By post.)
Local bazaar handbooks.
"B.C.G.A." leaflets and pamphlets. (By post.)
Folders, &c., issued by stove manufacturers.
Weekly advertisement in local newspaper.
Playing cards at Christmas.
Specially printed seasonal folders. (By post.)

We have recently fitted specially prepared coloured transparencies to the first-floor windows at our showroom; and these are illuminated at night—the lighting being controlled by a "Gunning" apparatus.

The amount expended by the Company annually on advertising and propaganda works out to about ¼d. per 1000 c.ft. of gas sold.

SPRING AND AUTUMN CAMPAIGNS.

In spring for cookers, and in autumn for fires, special advertisements are prepared for the local Press; and we circularize through the post those of our consumers who do not use the particular apparatus advertised. In 1925, it was decided to try a more extensive scheme for the cooker season than was our usual custom. We therefore circularized our consumers, and advertised in the newspapers, offering to fix free all apparatus ordered during a seven days' local exhibition. That week 1642 orders for cookers and fires were booked; whereas 35 orders was a fair average for an ordinary week for that time of the year. A similar concession was offered for fires for seven weeks in the autumn; and during that period the orders received amounted to 990. Over the corresponding period of the previous year, the orders numbered 150.

AGREEMENT WITH MASTER PLUMBERS.

We have a working agreement with the local Master Plumbers' Association; and during such rush periods as I have just mentioned, when it is quite impossible for our ordinary staff of fitters to deal with the orders quickly enough, this arrangement, by which the town plumbers fix apparatus on our behalf, has been of mutual benefit to both the plumbers and the Company, and avoids the annoyance and inconvenience of consumers having to wait for the apparatus to be fixed. Delays at such times would be unavoidable, were it not for the arrangement referred to. The scheme has worked very satisfactorily; and although over 500 gas fires and 700 cookers have been fixed to the Company's orders by the town plumbers since the arrangement was made, we have found, on inspection, very little to complain of in the quality of the work done.

CENSUS SYSTEM.

In circularizing consumers with regard to any type of apparatus, we are considerably aided by our census system, as by its use it is possible to see at a glance which houses in any particular street have not got a cooker, fire, or wash boiler. This saves much time, labour, and literature, in addition to the very desirable factor of not annoying customers by asking them to purchase or hire apparatus when they already have it.

I think a few words on this census system may be of interest to you. Our experience, when taking a census of the gas apparatus in the district, proved that a considerable number of consumers were "putting-up" with apparatus—more especially lighting equipment—which was not efficient. Complaints of one kind or another were received from about one house in every ten visited; and 75 p.ct. of the trouble was due to inefficient incandescent burners, the majority of which only required a good cleaning. Our census-takers did good missionary work in this direction, in showing consumers how to clean the burners, and explaining that in order to obtain the best results it was necessary to keep them clean. The other 25 p.ct. of the complaints were slight escapes, faulty lighting fittings, and fires and cookers needing adjustment. There is not the slightest doubt that the visits of the census-takers did good, and were the means of showing consumers what service they could, and should, get from the gas they paid for.

A good number of orders for additional apparatus were received by the men while taking the census; and a number were also booked at the showroom as a result of their visits. As a means of obtaining orders only, a census would not be a paying proposition; but when combined with the object of "putting things right," and securing a reliable record of apparatus in use, it certainly justifies the expense and trouble entailed in its adoption.

MANTLE MAINTENANCE.

One point particularly emphasized by the census was that, if we are to have satisfied consumers, a system of mantle maintenance and burner cleaning is essential. The Company adopted such a scheme in 1905; and it has never fallen away. But I think it would be to the Company's interest to lower the charges, and push the system as much as possible. The inspectors pay a fortnightly visit, at charges from 9d. per burner per quarter, and now attend to 3500 burners. To-day it is seldom that a lamp is fixed in business premises without its coming on to the maintenance system; and this, from our point of view, is highly satisfactory, as at no time has the necessity for fittings being maintained in their most efficient condition been so important. You all know from experience what happens in many cases where consumers look after lamps themselves.

SCHOOL LIGHTING.

In this connection, I may say that, having regard to electric light competition, we have found it good policy to give special attention to the question of maintenance of gas lighting in schools; and we have on our books thirteen elementary schools, out of a total of eighteen in West Hartlepool. Some little time ago we introduced to the Education Authority Sugg's "Westminster" lamps, three light and four light, and fitted-up one school as an example of what could be done to improve on the ordinary incandescent gas lighting. Each lamp displaced three or four "C" burners, and gave a very much improved lighting effect. This type of lamp is now being adopted in other schools with very satisfactory results; and we hope before long to have all the schools fitted-up similarly. The charge to the school authorities for maintenance of lamps has been fixed so that no more is paid than was the case when "C" burners were in use; and, in addition, there is a saving to the Education Authority in gas consumption. Our maintenance system yields no monetary profit; but this fact is very much outweighed by the satisfaction given to our consumers, and the retention of gas lighting which might otherwise be lost to electricity.

With regard to the type of lamp just referred to, when these were fixed to iron piping considerable difficulty was experienced by reason of rust from the inside of the piping getting into the gas nipples. It has been found necessary in some places to take down the lamps for cleaning every three weeks; but this trouble has been overcome by using a simple, though effective, dust trap invented by our senior maintenance inspector. These dust traps were first used about two years ago; and since then a choked nipple has been a very exceptional

occurrence. It is hardly necessary for me to say that (on premises with iron internal piping) no superheater lamp is now fixed by the Company's fitters without a dust trap.

There are thirty medical men in the Company's district with an average of three gas fires installed on their premises; and to the best of our knowledge only four doctors do not use gas for heating But we find that gas fires, even on doctors' premises, are often allowed to get into faulty condition; and no complaint is made until they are almost unusable, and have become very bad advertisements for gas heating—especially in waiting rooms and surgeries. So recently we sent a fitter round to all the doctors' houses, with instructions to overhaul the gas fires and renew radiants where necessary, without any charge being made. This unrequested attention was appreciated; and it was decided to retain the fitter on a thorough gas fire inspection on similar lines. This has proved useful work—especially considering the numerous burner adjustments made during the recent emergency conditions due to the coal strike.

High-Pressure Lighting.

Some years ago compressors were installed at the works, and mains laid along the principal shopping streets in the town, to supply high-pressure gas for outside window lighting; but though this system has been specially advertised, and the shopkeepers have been circularized and canvassed often, high-pressure lighting is not making the progress it should, in spite of the fact that I have no hesitation in saying the best-lighted windows in the town are those illuminated by outside high-pressure lamps.

The competition in exterior window lighting is not from the outside electric lights, as there is not much done in that direction by the Electricity Department; but it appears to me that, with the introduction of high-lighting units in gasfilled electric lamps and concealed lighting, shopkeepers are concentrating on inside window illumination. I am afraid we cannot ignore the fact of the adaptability of electric fittings and flexible wire for certain window displays. Some 75 p.ct. of our high-pressure consumers utilize electricity for inside lighting and high-pressure gas for the outside.

Cookers on Slot Installations.

The people in the Hartlepools are almost entirely engaged in ship and engine building, blast furnaces and rolling mills, and the importation of timber; and we have not found a great deal of scope for gas for industrial purposes, so that our hunting-ground is mainly the field of domestic heating and cooking. The Company's outside staff, whether plumbers, gasfitters, inspectors, or collectors, are continually on the look-out for likely orders, for which they receive as commission 1s. for a cooker or fire, and 2½ p.ct. on the selling price if on hire-purchase or sale.

Originally only a griller was supplied with slot installations; but during the last few years we have, in the case of approved consumers of this class, fixed cookers on hire, making a charge of 5s. or 10s. for fixing, according to the length of pipe run, up to 35 ft. As payment for fixing was required in advance, no bad debts were incurred in this respect. During 1926, 1717 cookers and 125 fires were fixed for slot consumers. This means an additional capital expense of about £5 per house; and a rent of 2s. 6d. per quarter is charged, which is equal to 10 p.ct. on the outlay towards interest and depreciation. We find that, on the average, the consumption per working-class house with a cooker is 10,000 c.ft. more than the average of the houses where there are no cookers; so that the return in revenue is commensurate with the outlay.

In view of the success of the free-fixing experiment in the spring of 1925, it was decided in March last year to adopt this policy permanently as far as cookers were concerned, subject to a minimum hire period of two years. The effect of the change was soon apparent; and we were inundated with orders for a while.

Between March 15 and Oct. 1, when we temporarily discontinued free fixing owing to strike conditions, 1905 orders for cookers were received. The shortage of fuel during the long strike period undoubtedly accounted for a large number of these orders; but it is just as certain that the number would not have been so great had the free-fixing policy not been adopted. With regard to slot consumers, we only fix cookers in approved premises in order to avoid difficulty in the future with regard to collecting the rents.

Size of Meters.

I might add that, in all cases where a cooker is fixed, 3-light meters are changed to 5 lights, or No. 2. The recent "friendly" competition among the meter makers has rendered this a less costly undertaking than it otherwise would have been.

We recently extracted from our books particulars of averages of gas consumed in houses with slot meters using various appliances on the Corporation Housing Estates; and the following details may be of interest to you:

Houses Using—	Average Consumption per Annum (1926).
	C.Ft.
Electric light and wash boiler	11,500
Electric light and cooker	14,100
Electric light, cooker, and boiler	18,000
Electric light, cooker, boiler, and fire	24,700
Average Artisan District.	
	C.Ft.
Gas lighting and cooker	25,800
Gas lighting only	15,700

The increase in average consumption per slot meter in the Company's district is very marked, as will be seen from the following table:

Gas Consumed through Slot Meters.

Year.	Number of Prepayment Consumers.	Total Gas Consumed in Thousands.	Average per Consumer per Annum.
		C.Ft	C.Ft.
1900	3,050	22,825	7,400
1905	5,495	43,561	6,900
1910	7,943	51,281	6,500
1915	8,736	67,047	7,600
1920	9,454	122,381	12,900
1925	10,589	153,172	15,400
1926	11,576	207,144	17,900

It will be noted from the above figures that, since 1915, the number of prepayment consumers has increased 32 p.ct., but the average amount of gas consumed has more than doubled; so that the efforts directed towards the development of the use of gas have been effectual.

The number of apparatus on hire has been also increased very considerably during the past ten years; the totals being as follows:

Total Apparatus on Hire and Gas Sold.

Dec. 31.	Cookers on Hire.	Fires on Hire.	Total Consumers.	Gas Sold.
				C.Ft.
1915	2001	538	17,566	340,533,000
1920	2499	861	18,556	462,340,000
1925	5142	2458	19,402	487,227,000
1926	6822	2431	20,019	508,948,000

From this table, it will be seen that, although the total number of consumers has, during the period shown, only increased 14 p.ct., the total gas sold has increased 49 p.ct. This is further evidence in favour of continued propaganda and efficient service.

We have at times some difficulty in collecting the quarterly rents of cookers and fires on slot installations; but it is not serious, notwithstanding the bad time. Some of you may say: "Why not alter the meters so as to make each penny or shilling bear some part of the rent?" But in our case this would not be an equitable arrangement, seeing that only one slot consumer in every three has a cooker.

Meters Set at Different Prices.

Personally, I am not in favour of having slot meters in the district set to different prices, although this would be one way out of the rent difficulty. I am afraid that, unless the meters were carefully and distinctly badged, and as carefully taken out from the store, trouble would occur through cooker meters being fixed on non-cooker supplies, and vice versa; and then again, there is the trouble and expense of changing meters when apparatus is disconnected, or the alternative of changing wheels or altering discs, which would necessitate a second fitter being sent to the premises. Extra care would also have to be exercised in entering-up inspecting books or cards; and I can imagine the slot collectors at times experiencing difficulty in making the money agree with the consumption, and having to go back into dark cupboards to make another inspection of the meter.

Conclusion.

In conclusion, I would like to say that, as far as gas sales development is concerned, I am very sanguine as to the future, notwithstanding the increasing competition we are having locally from the Corporation Electricity Department and the Newcastle Electric Supply Company; and I am pleased to be able to say that the rivalry between the electricity undertakings and ourselves is carried on in a fair and friendly spirit. We must not, however, under-estimate the strides that are being made in electrical appliances, and the publicity given throughout the country in favour of electrical development. It is al-

most impossible to read a newspaper without being faced with some form of electrical propaganda; and if this is to be combated satisfactorily, the gas industry must of necessity continue and increase its national propaganda work, and be backed-up by local effort on the part of individual undertakings.

Discussion.

Mr. C. F. BARROW (the newly appointed Chairman) said there was not much in Mr. Weldon's paper to criticize, he thought, but a lot to commend. In Sunderland they adopted the showroom idea twenty years ago, and found it a great asset. They had also had a maintenance system for the same period. The service was given free; they charged for the material only. The Company found it a good scheme, and extended it. Now thirty men were engaged in burner and other apparatus maintenance. They also had a high-pressure lighting system which had gone well; but as a paying proposition, he had not much to say about it. It was keeping-out the electric light. They had to meet keen competition in Sunderland; but it was fair rivalry. The Council had built 140 houses; and the Company had succeeded in knocking the electric light out of 70. They had gas for heating and cooking; but the Company also wanted it there for lighting. Regarding outside lighting of shops, he had pointed out to one firm who wished to do away with high-pressure gas lighting outside and adopt electric lighting inside that, while they might get a better effect, it would not attract a crowd to the shop in the same way as outside lighting. Three of the most successful business firms were those who had high-pressure gas lighting outside; and one which had removed the high-pressure gas lighting had gone into liquidation.

Mr. G. W. MARTIN (Houghton-le-Spring) asked several questions regarding the schemes adopted by the distribution department of the Hartlepool Gas and Water Company. One concerned the agreement with the local plumbers for the fixing of gas fires and cookers. Did the Company deliver the fires and cookers, and allow the plumbers to supply the piping and charge it to the Company, or did the Company measure-up the piping and deliver it to the job? Did the Company supply the fuel for the gas fires free? During the coming winter they would have to do more to fight the electricity undertakings. The distribution side of the gas industry in the future would have to be looked after more than it had been in the past.

Mr. C. S. READ (Washington) said that they had a similar system of record cards; but after a year or two they found the record was not accurate, on account of fires being sold by one party to another. Did they make at Hartlepool any special effort to keep the record cards accurate? Gas cookers were being more used in colliery districts, though the miners were supplied with free coal. The trouble was that they did not know how to use them; and he thought it would be an advantage if someone was detailed-off by the smaller concerns—it was already done by the larger ones—to make periodical visits, and instruct those who did not know how to utilize the cookers.

Mr. WELDON, replying, said that in the matter of electricity they had the Hartlepool Corporation; and there was an "iron door" against the Company. Electricity was included in the rent in the Council houses. Regarding maintenance, he said that the quarterly charge of 9d. per burner also included a couple of mantles. It was practically the same as Sunderland. They only charged for the material; the labour being free. As to the arrangement with the local plumbers to fix fires and cookers, these were delivered by the Company, and the plumber supplied the piping and sent in his account to the Company. The work was inspected by a representative of the Company; and the accounts were paid monthly. No fire was fixed free. There was a charge of from 5s. to 10s., according to the quantity of piping used. Cookers hired were now fixed free, including 25 ft. of piping, and slot cookers up to 35 ft. He had heard that in places where instructors in the use of cookers were employed they met with a mixed reception.

Mr. G. E. ANDERSON (Willington Quay) proposed a vote of thanks to Mr. Markham and Mr. Weldon for their papers. He considered Mr. Markham's paper would form a useful reference work in a condensed form. He had had an opportunity of working with Mr. Markham; and they could accept the information given by him as perfectly sound. The two papers were very suitable for a meeting of that character.

Mr. JOSEPH M. FOREST (Stanley) seconded, and commented upon the usefulness of reinforced concrete in gas-works. It did not rust; and this was one of the troubles they had with iron.

Mr. BARROW invited the Section to hold the next meeting at Sunderland; and this was accepted.

Mr. C. S. READ (Washington) proposed a vote of thanks to the Chairman, Secretary, and Committee for their services during the past year.

Mr. O. H. INGHAM (South Shields) seconded; and the resolution was carried unanimously.

The CHAIRMAN and Mr. BAGSHAW (the Secretary) acknowledged the vote.

Waverley Association of Gas Managers.—The Association will hold their annual meeting in the premises of Messrs. Ferguson & Forrester, Ltd., 120, Princes Street, Edinburgh, on Friday, June 24. The President, Mr. J. F. Skea, of Jedburgh, will take the chair at 11 o'clock, and will deliver an address which will be open for discussion. Following this, Mr. H. R. Hiscott (Le Bas Tube Company, Ltd.) will read a paper on the "Manufacture of Malleable Iron Pipes and Fittings." Luncheon will be followed by a motor drive to South Queensferry and Linlithgow.

DENSITY IN RELATION TO PRESSURE DEVELOPMENT IN GAS EXPLOSIONS.

On Friday, June 10, Prof. W. A. Bone, F.R.S., delivered the sixth of a series of eight lectures upon "High-Pressure Gas Research" at the Imperial College of Science and Technology. The lecturer dealt in general with the influence of initial pressure (density) upon the rate of combustion and of pressure development when explosive gas mixtures are ignited in a closed vessel. The simplest case to consider is that of the combustion of a hydrogen-air mixture containing sufficient air for the complete combustion of the hydrogen, such combustion being free from complications due to any intermediate or secondary reactions. A number of slides were shown of pressure-time records of explosions of such mixtures ($2H_2 + O_2 + 3{\cdot}76\ N_2$) over a range of initial pressures from 3 atmospheres to 175 atmospheres. The general feature of these explosions is a marked increase in the explosion times and the pressure ratios with increase in density. These increases are not unexpected; and their explanation presents no difficulty.

Turning now to carbonic oxide-oxygen mixtures, a very similar result is obtained with the mixture having the composition $2CO + O_2$; the diminution in explosion time being, if anything, more marked than in the case of the hydrogen-air mixtures. When this mixture is diluted with oxygen, carbonic oxide, argon, or helium, the resultant mixtures behave in an identical manner—all show a marked diminution in explosion time and increase in the pressure ratios.

The addition of nitrogen (as diluent), on the other hand, produces a very remarkable change in the character of the pressure-time record as the density is increased. For example, the two mixtures $2CO + O_2 + 4O_2$ and $2CO + O_2 + 4N_2$—both, be it noted, producing the same amount of heat on combustion and giving products having the same heat capacity—give practically identical pressure-time records at 3 atmospheres pressure. As the density of the initial mixture is increased, the nitrogen-containing mixture begins to behave in an abnormal manner. The explosion times increase rapidly and the rates at which the hot products of combustion cool decrease to such an extent as to indicate that a distinct exothermic reaction is proceeding after the attainment of maximum pressure.

Prof. Bone dealt at some length with the results obtained from an analysis of the pressure-time records from such comparative explosions, and showed how it was possible to estimate quantitatively from the records the magnitude of the exothermic effect. A simple explanation of this apparent abnormal behaviour can be given on the assumption that nitrogen does not act merely as a diluent, but plays a definite part in the energy interchanges that occur when carbonic oxide burns.

The subject of the activation of nitrogen and its industrial applications in the manufacture of oxides of nitrogen will be dealt with in the next lecture, to be given on June 17.

Association for Education in Industry and Commerce.—The ninth annual conference will be held on June 28, 29, and 30, under the Presidency of Sir David Milne-Watson, LL.D., D.L., at the Kensington Showrooms of the Gas Light and Coke Company. The principal subject of the conference will be "The Recruiting of the Young Employee in Industry."

The Eyesight of the Young.—The Education Authority of Smethwick have recently had the whole of the lighting in their schools (at which over 12,000 children are being educated every year) brought up-to-date. Some 2000 new gas lamps and fittings of different designs and candle powers have been provided to meet the varied requirements. The Education Committee have inspected the schools and expressed their satisfaction at the amount and quality of the light provided. The domestic centres are equipped with smokeless cooking, water-heating, and ironing appliances of the type which the children will use in later life; and the whole of the teachers' staff rooms in the borough are being heated by gas fires. Full particulars of these developments, together with an interesting series of photographs, are to be found in the current issue (No. 159) of "A Thousand-and-One Uses for Gas."

Facilitating Building Operations in Winter.—What is believed to be the first building heated by gas while under construction is the new office building of the Boston Consolidated Gas Company located in that city, remarks the New Jersey Public Utility Information Committee. That Company have definitely entered upon a sales policy advocating the use of gas in house heating, and are following-out their own recommendations for the use of gas as fuel by installing gas-fired boilers to heat their own building when completed. As a large part of the construction had to be carried out during the winter time, it was decided to heat the structure with gas while the building was progressing. The ease and efficiency of this type of heating were so marked that the completion of the building has been advanced fully a month ahead of its original schedule. This is said to be due to increased efficiency of the workmen and elimination of the many delays usually caused by extremely cold weather.

NEW SULPHATE PLANT AT DERBY.

The permission of Mr. J. Ferguson Bell, Engineer and General Manager to the Derby Gas Light and Coke Company, and Past-President of the Institution of Gas Engineers, enables us to place before our readers certain details in connection with the new plant installed at Derby for the production of sulphate of ammonia from gas liquor.

With the present-day prices of sulphate it became increasingly evident to many gas engineers that the cost of manufacture of this commodity had to be reduced to a minimum, in order to show a reasonable profit; and in considering the cost of production, naturally labour costs, bagging, storing, and dispatching charges came under review.

Some two years ago the plans of a labour-saving plant were placed before Mr. Ferguson Bell by the Chemical Engineering Company; and while the plant was entirely new, and novel in design, Mr. Bell saw sufficient evidence of the possibility of success to instruct the Chemical Engineering Company to proceed with a 6-ton per 24 hours installation at the Litchurch Gas-Works.

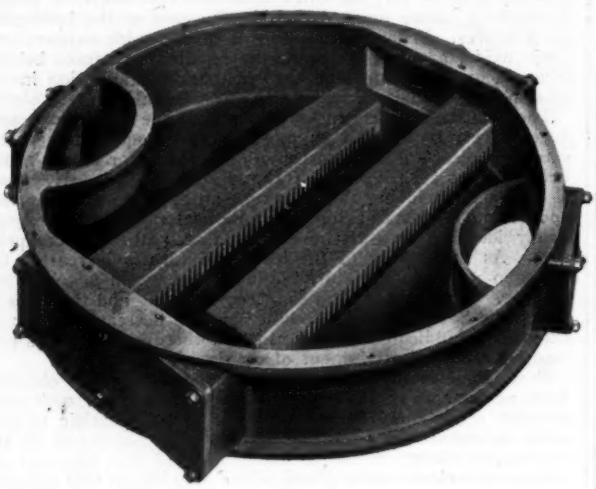


Fig. 1.

Six months later the plant was put to work, and performed its guarantees within three weeks. However, difficulty subsequently occurred in finding suitable materials and pumps which would stand up to the corrosion resulting from the special nature of the process. It was due partly to the expert knowledge of Mr. Ferguson Bell and his staff that the initial difficulties of the plant were ultimately overcome; and we are informed that the plant is now considered by all to be a commercial success and a labour-saving installation. Future developments on the lines of the first installation are likely to be provided by the Chemical Engineering Company, who have plans already prepared for a further big step in the direction of rendering sulphate of ammonia plants up to any capacity practically mechanical in operation and requiring the minimum of supervision.

The Derby plant was designed and patented for reducing the amount of labour and fuel in handling sulphate of ammonia after it is ejected from the saturator, and in producing high-grade crystal neutralized salt. Fig. 1 shows a section of the new type of liquor still, by which an enormous saving in steam consumption has been effected. An effort was made by the designers to effect a substantial saving for the Gas Engineer in his fuel bill; and the results have been entirely satisfactory. Wastage of ammonia in the effluent is so low as to be absolutely negligible, and the amount of steam used is half that which was previously necessary per gallon of liquor treated.

Lime Slaking Tank.

This was provided of ample dimensions, so that the milk of lime, when once mixed, would not require more than one or two inspections per shift. In many plants the lime is slaked by cold water, and then pumped into the still at a temperature below boiling-point. The Wilton process, however, consists in using hot effluent liquor for slaking the lime, which reduces the amount of effluent discharged from the still, and in supplying the milk of lime in a boiling condition to the still. By this means, steam used by the still and the quantity of effluent are reduced; and any loss of ammonia in the effluent can be immediately detected in the lime slaking tank.

Lime Pump.

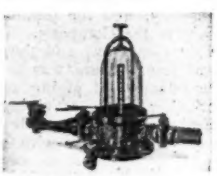
The lime pump used for this boiling milk of lime is a special feature of the Wilton plant, and is so constructed that wear and tear of parts is practically impossible. It is especially desirable to avoid wear and tear when pumping gritty material such as milk of lime. The pump, which is of the standard Wilton type, is merely a cylinder of cast iron into which the boiling milk of lime is fed by gravity. As it rises in the body of the pump, it lifts a valve operated by a float; and when it reaches a certain mark on the body opens a steam port on the top of the liquid. A given quantity of boiling milk of lime is then driven into the still. As the liquid disappears from the body of the pump, the float drops, closing the steam port at the top and again admitting a charge of boiling milk of lime to the body of the pump. The difficulties of pumping boiling liquids are therefore overcome by this method.

Spent Liquor Valve.

This automatic valve allows the spent liquor to be discharged at the bottom of the still without loss of steam. The valve operates on the principle of a steam trap, but is designed for

Lime Pump.

Spent Liquor Valve.



Sight Feed Apparatus.

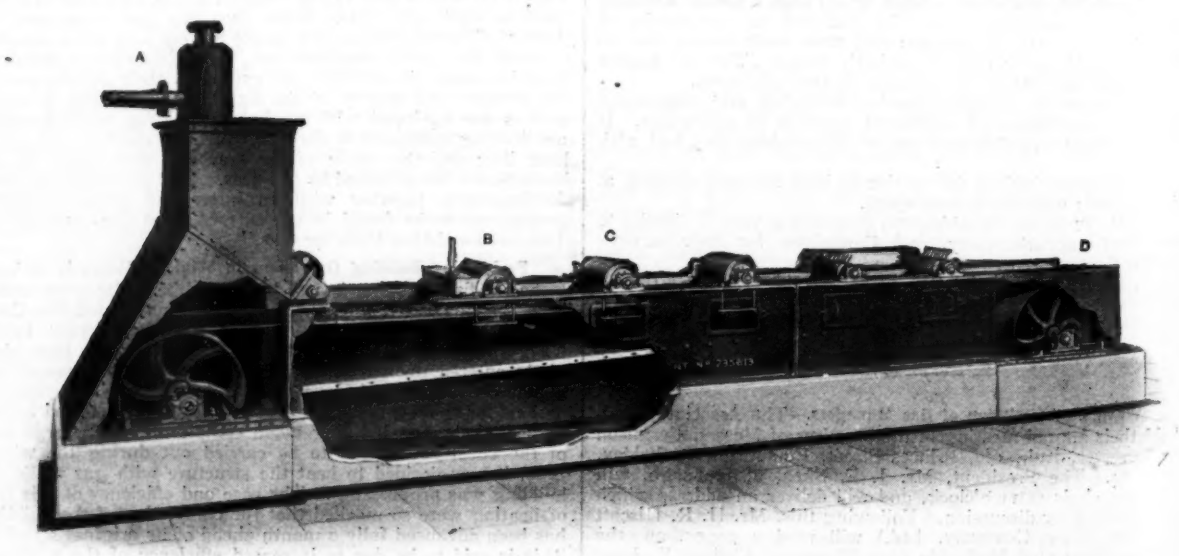


FIG. 2.

low pressures and for the releasing of large quantities of liquid. It is entirely automatic and self-adjusting, and works on a similar principle to that of the lime pump.

CATCH BOX.

As it is important for the satisfactory working of the saturator that the vapours going into the saturator from the ammonia still should be free from liquor, a ring casting is provided at the top of the still, and a further protection is given by a catch box, which is fitted on the outlet pipe of the still. Any liquid carried forward by the gas, which may reach this box, is caught and returned to the still by gravity. Thus only dry vapours pass forward.

LIQUOR SIGHT FEED.

The speed of flow of the liquor supply to the still is important in calculating the efficiency of the still and determining the satisfactory working of the plant. In the Wilton liquor sight feed apparatus the flow is plainly discernible, together with the quantity, in gallons per hour, which is passing at any given time.

Fig. 2 shows the mechanical drainer provided. This, with its mechanical separating hopper, takes the place of the draining table and the centrifugal machine. The hopper A is fed from the saturator by a steam ejector; the liquor overflowing from the hopper through the overflow pipe returns straight to the saturator. The wet salt is ejected at the bottom of the hopper by a discharge valve which feeds the salt on to a moving perforated belt constructed of special material. This belt, which travels at any speed from 10 in. to 12 in. per minute, conveys the salt from a point where it is fed from hopper A to point B, where air suction is provided to drain the salt by vacuum. The conveyor transports the salt slowly past the first vacuum shoe to a point C, where a weak ammonia spray, which is constantly raining on the salt as it passes beneath, provides suitable neutralization. Beneath this spray there is a further suction shoe, which immediately removes the moisture of the weaker ammonia solution, and incidentally carries away any pyridine vapour and other noxious odours, which are so evident when neutralizing is carried out in centrifugal baskets.

As the conveyor proceeds, a further suction shoe is provided whereby the final percentage of moisture is extracted, leaving from 5 to 7 p.ct. moisture in the salt as it passes from the conveyor band at point D. Here a fixed plough is arranged to take the salt off the belt, and project it mechanically into a steam-heated drier of the type shown in fig. 3.

This steam-heated drier, the design of which incorporates a nest of tubes rotating at a speed of only 15 R.P.M., provides the most efficient means of drying sulphate of ammonia without damaging the crystals before ejection at the outlet. These machines, which have been at work now for several years, removing moisture up to 15 p.ct., require little attention, and produce dry neutral crystalline salt of No. 1 grade. One of the greatest difficulties in the first installation at Derby was to find a suitable pump which would deal with large quantities of air and moisture, and at the same time resist the attack of acid and alkali, pyridine, &c.; and the solution —an efficient steam jet ejector satisfactory in providing the necessary vacuum for draining the salt—was due to the Derby Gas Company's staff. At the Derby Gas-Works the outlet of the dryer is provided with a machine for weighing the sulphate of ammonia straight into bags. The Chemical Engineering Company have plans for substituting this arrangement with a method of bagging at one time of the day only, instead of continuously.

ADVANTAGES OF THE PLANT.

Noxious gases are eliminated, as also are dangers of high-speed machinery such as centrifugal baskets. Modification of the draining table to render it self-acting, instead of its requiring constant attention, is an important feature; and further developments may be expected from the original designs, especially in regard to the operating costs of the complete plant. The cost has now been reduced to a minimum, thus providing for profit in the manufacture of sulphate. It is difficult at this stage to assess what saving may be effected in repairs and maintenance on the plant, owing to the fact that the initial plant at Derby was the first experimental one, and has not had a lengthy run under existing conditions; but it is confidently expected that several hundreds of tons of sulphate can be treated on one of the perforated belts before renewal is necessary, and the cost of renewal is considerably less than that of centrifugal baskets. The initial cost of the plant produced by the Chemical Engineering Company will be little different from that of the ordinary standard sulphate plant previously supplied.

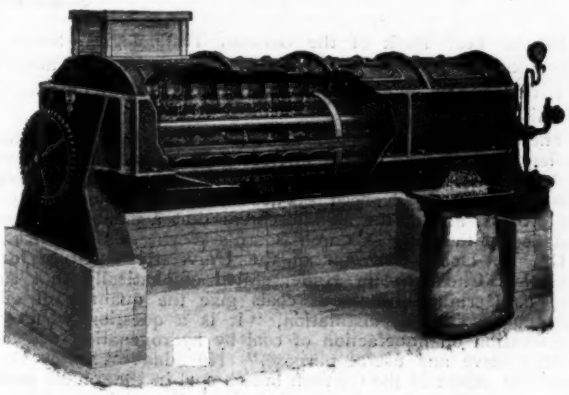


FIG. 3.

In fig. 4 we give a general outline of the arrangement of the plant. In future installations the following points will be adjusted as a result of practical tests at Derby:

- The conveyor will be shortened, and brought down to ground level, or nearly to ground level, thus saving expense on overhead galleries.
- The feeding gear to the conveyor will be modified to give a more mechanical feed than can be obtained with the ordinary gate discharge valve.
- The drying machine will be arranged in a more convenient position to allow of future modification of elevators for bagging purposes.

The firm expect that, by these alterations and additions, a greater margin of profit will be shown for sulphate of ammonia making than has been gained in the past.

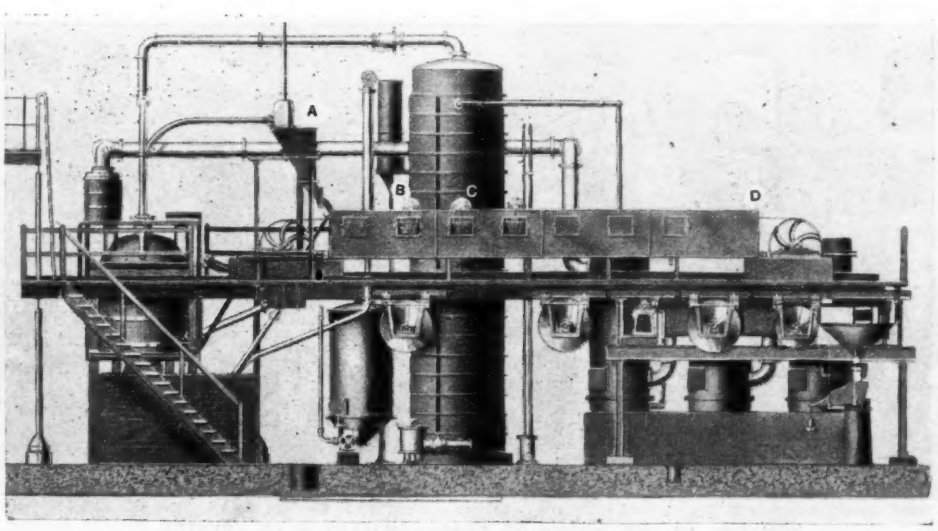


FIG. 4.

YORKSHIRE JUNIOR GAS ASSOCIATION.

A meeting of this Association was held at Keighley on Saturday, May 21. The members, accompanied by the President, Mr. S. T. S. Musgrove, of Sheffield, assembled at the works of the Keighley Gas Department, where they were met by Mr. A. Bromley, the Engineer and Manager. The members made a tour of inspection of the works. Mr. Bromley, Mr. S. G. McLusky (Works Superintendent) and Mr. J. McLusky (Chief Chemist) conducted the party round the works, and after the tour the visitors were entertained at tea by the Keighley Gas Department.

Mr. C. H. CHESTER (Wakefield) proposed a vote of thanks to the Keighley Gas Department and to Mr. A. Bromley. He remarked that the condition of the works was very creditable, and spoke well for efficient management of the undertaking.

Mr. R. N. WEBB (Leeds) seconded the vote.

Mr. BROMLEY, replying, said that he would convey the vote to his Committee. He was out to help the Juniors as much as he could, because he realized that the Juniors of to-day would be assuming command of works in the future; and it was up to them all to give whatever help they could. They were proud of their works, which were debt-free; and credit was due to his predecessors, especially Mr. Laycock, whose foresight and attention to detail had resulted in the works being planned to the best advantage. They were also proud of the fact that they supplied cheap gas; and although consequent upon the general strike the price had had to be advanced 6d., they were hoping that from July 1 it would be 2s. 9d. *less* 5 p.ct. They made 525 million c.ft. last year, showing an increase of 50 millions. They were supplying gas of 520 to 530 B.Th.U.

THE BERGIUS PROCESS.

Some Expert Views.

In the Year Book of the German Technological Society (Brennkrafttechnischen Gesellschaft) just issued appear authoritative German opinions on the Bergius process of hydrogenation of coal.

These opinions, delivered at the annual meeting of the Society, are of considerable interest at the moment, in view of the recent statement in the Commons that the British Government had advanced £25,000 for the development of the process, and of the announcement that a plant had been installed at the Fuel Research Board's Works at Greenwich.

Dr. M. Dolch, Director of the University Institute for Technical Chemistry in Halle, stated emphatically that so long as German bituminous coals give the quantity of oil they do by straight distillation, "it is a question whether a discussion on liquefaction of coal by hydrogenation will at present serve any useful purpose." He adds: "Surely the economic aspect of the German brown coal in the middle part of Germany is intimately bound up with the well established distillation industry; and it is, therefore, too early to speak of a threatened influx of hydrogenation of coal, if one can at all talk of a threat in that direction." He goes on to say that the distillation in a rotary retort which has been employed for black coal is the only method which for the moment can be put forward as a successful distillation method.

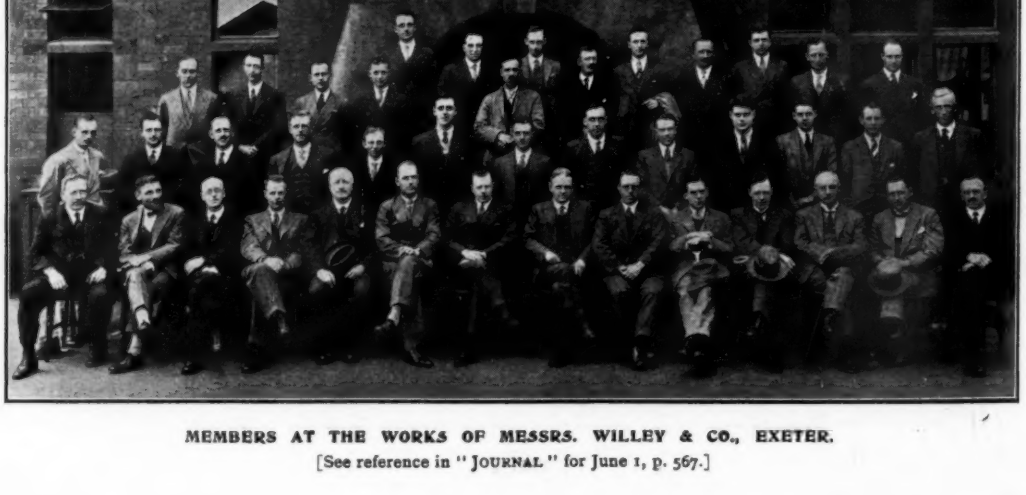
Prof. Seidenschnur, Director of the Brown Coal Research Institute in Freiburg, Saxony, and one of the best-known brown coal experts in Germany, is very much to the point. He says that since the Bergius process must of necessity deal with dry brown coal, and consequently requires extensive drying plants, and when one considers that, for every kilogramme of wet brown coal dealt with, 330 cal. are expended in drying, and only 70 cal. in actual distillation, it stands to reason that the brown coal should be distilled first, before hydrogenation is attempted. Consequently, whatever great promises the hydrogenation process holds out, a satisfactory distillation method will always have its proper place in the conversion of coal into oil.

Director Lest, of Muskau, in his lecture, compared the various synthetic processes for producing oil from coal, and maintained that the "synthol" (Franz Fischer) and the "methanol" (the Badische Anilin) processes, which produce alcohols and mineral oils, have their proper place, after low-temperature distillation of coal, for dealing with the residue. These systems are entirely different from the Bergius process. He considers they are more easily applied on an economic scale than the Bergius method, and is of opinion that it is problematical whether a hydrogenation process is at all necessary in view of the fact that the straight distillation processes now produce the oil on an economic basis. He is sceptical as to the low production costs claimed by Bergius at the Pittsburgh Conference.

Mr. W. Vorbrodt, of Spandau, in his contribution towards the discussion, says with regard to the hydrogenation of coal: "I can only state that I am in agreement with Dr. Dolch. As long as it is possible, by the distillation of bituminous coal, to obtain liquid fuel and motor oils, the distillation method will always be economically superior to the hydrogenation process. When the distillation method is no longer in a position to cope with the oil quantities required in the open market, the hydrogenation method would then be possible; but, according to my view, pre-distillation of the bituminous coal followed by hydrogenation of the residue will be the only sensible way of tackling the problem economically."

The reason why there are no commercial or large-scale Bergius plants in operation in Germany to-day will be obvious from the above views expressed by some of the leading people in Germany. These statements further retard the hope that the £25,000 invested by the British Government in the Bergius process will yield any early return.

WESTERN JUNIOR GAS ASSOCIATION.



MEMBERS AT THE WORKS OF MESSRS. WILLEY & CO., EXETER.

[See reference in "JOURNAL" for June 1, p. 567.]

THE GAS INDUSTRY IN FRANCE, 1927.

From a Review in the Jubilee Number of the "Journal des Usines à Gaz."

Our congratulations are extended to our contemporary, the "Journal des Usines à Gaz," on the attainment of its fiftieth birthday and on the special number with which the event, on May 4, was celebrated. The journal was founded in 1877 by a past-president of the Civil Engineers, M. Jordan, and two gas engineers, MM. Monnier and Servier, and was intended to deal with all matters of interest to the gas industry, as well as with water supply and public hygiene—wherein we detect a family likeness to the infant's then 28 year old brother "The Journal of Gas Lighting, Water Supply, and Sanitary Improvement." Unlike the latter, however, the French Journal has never been completely independent, but has been the official organ of the Société (now the Association) Technique, and managed by a Committee and Editor appointed by the latter. The name of the newly constituted Association Technique appears for the first time on the cover of this jubilee number, which breaks with tradition in departing from the well-known orange wrapper in favour of grey.

The jubilee number was profusely illustrated, and contained an article on the industry in France 50 years ago, one (from which the following extracts are made) on the industry as our contemporary sees it to-day, and one on the scientific research which is being carried on by the French gas companies.

The Influence of the War.

Turning now to our contemporary's examination of the current situation, we find expressed the opinion that the driving forces behind evolution now are the same as they always have been, but that during and since the war they have become more insistent. As regards labour, for instance, not only from the economic but from the social point of view, every transformation must tend to reduce the number of workers, and at the same time replace brawn by brain as far as possible, and man-power by machinery. The soaring of the price of coal now encourages the extraction of as much as possible of its product, especially gas; and war-time anxieties and post-war economics have given a fillip to the demand for home-produced explosives and motor spirit.

Hydrogenation and Synthesis.

Many of our laboratories are at the moment actually engaged in research on the transformation of coal into liquid fuel, either by direct hydrogenation at high temperature and pressure or by the synthesis of the elements of gasification—carbon monoxide and hydrogen. But these processes, interesting though they be, have not yet materialized from the economic point of view the promises of their inventors; and high-temperature carbonization, with its main object of producing gaseous calories, still remains the real solution of the problem of coal treatment.

The "Best" Quality of Gas?

One matter which continues to claim the attention of the industry is the best quality of gas to distribute; and laboratory research has also dealt with this. The conclusions at which Bertelsmann and Eitner have arrived in Germany are at the moment almost universally accepted—namely, that it is useless to distribute gas of exaggerated calorific value, 5000 calories [562 B.Th.U.] for example, for its price is unnecessarily high, and the heat content is badly expended; too low a calorific value, say 3600 calories [404 B.Th.U.], is equally prejudicial. The best course is to adopt the middle one, and supply gas of the order of 4500 calories per cub.m. [505 B.Th.U. per c.ft.]. In England, since the 1920 Act established the heat-unit basis, 90 p.ct. of the undertakings are supplying gas in the neighbourhood of 4500 calories [505 B.Th.U.]. The French gas industry is now working under a Cahier des Charges of the Ministry of the Interior, of 1921, which fixes at the reasonable maximum of 4500 calories [505 B.Th.U.] the value which may be prescribed by the Municipalities; the object being to avoid the waste of coal. On the other hand, the law of July, 1923, made obligatory the removal of benzole; and this has brought in its train the substitution of illuminating power by heat units for testing purposes. The distribution of water gas mixed with coal gas was prohibited until the year 1919; and since that date it has only been permitted provided that the CO content does not exceed 15 p.ct., and that the gas as supplied always preserves the characteristic odour of coal gas.

Carbonization.

The article claims for M. A. Coze the invention of the inclined retort in 1886; and it points out that the original idea of employing the force of gravity for discharging coke from the retorts has come back to France from abroad with the inclined Munich chamber ovens. The first installation of the latter was at the Gennevilliers Works in 1912; and the works at La Villette put in three batteries of them in 1914, and have added nine batteries during and since the war. This system of carbonizing can only be applied to very large works, which explains why the only other new installation is that under construction by the Société du Gaz de Paris at the Cornillon Works.

For medium-sized works, gravity charging and discharging found its first expression in the Dessau-Bueb intermittent vertical retorts in Germany; and this system, as well as intermittent vertical ovens, has been widely adopted in France. It is remarked, however, that the last word in carbonizing plants is continuous verticals of the Woodall-Duckham or Glover-West type as developed in England; but it is recalled that MM. Verdier and Teulon, long before the war, were experimenting with continuous verticals at the Perrache Gas-Works. The system did not spread greatly in France till after the war; but to-day there are some 20 French gas-works provided with Woodall-Duckham or Glover-West installations. The Glover-West system finds great favour with small undertakings; while the Clichy Works of the Société du Gaz de Paris, which is undergoing reconstruction, will be entirely equipped with Woodall-Duckham retorts. The first bench has been started up; and the total capacity of the works will amount to 500,000 cub.m. [17,655,000 c.ft.] per 24 hours.

The heating of the settings is almost always carried out by built-in producers designed along the lines of Siemens' original apparatus. Attempts have been made, with more or less success, to mechanize these individual producers so as to reduce or eliminate cleaning; but in this regard the simplest and most immediate solution would appear to lie in the installation of independent producers, linked-up in the case of large works so as to form a central poor-gas station. Among the advantages of the independent producer is that even small works can consume its own coke breeze and inferior fuel. The "Gaz de Paris" is equipping its two new works with independent producers of the Marischka-Kerpely type; and the Lyon undertaking is installing Marischka producers for new benches at La Mouche. The opinion is expressed that in the future the independent producer is unlikely to remain the prerogative of large works.

Heat Conservation and Recovery.

Knowledge of refractory materials has been augmented by laboratory research to an extent that will permit universal employment of the high temperatures which will alone ensure increased throughputs; and waste-heat boilers are now widely adopted. The greatest interest at the moment, therefore, is being accorded to various systems for recovering the calories from incandescent coke, either by the circulation of inert gases (as in the Sulzer process), by radiation, or by spraying water under pressure, as in the Heller-Bamag plant, whence one obtains a mixture of steam and a certain amount of water gas. The Sulzer system is now operating at a number of gas and coke works; and good reports of the results are received. The other processes, the review says, have not yet emerged from the works where they were born; and it is difficult to give an appreciation of them, especially as they are all of foreign origin.

Wet Purification and Dry Gasholders.

After remarking that far less change has taken place in methods of treating the gas after carbonization, the review makes a brief reference to the carbonate process of purification, which has the advantages of saving labour and ground space. On the other hand, various difficulties—notably recovery of the sulphur—have retarded its adoption by the gas industry; and it is apparently essential to provide an auxiliary dry purification plant for either pre-treatment or finishing-off.

A real novelty, however, has been the appearance of the waterless gasholder, regarding which our contemporary's only remark is that it must no longer be looked upon merely as a metal erection, but as a piece of mechanism which must have constant supervision and maintenance. The Lyon Company is building the largest example in France.

The constant-volume, variable-pressure holders, spherical or cylindrical, which have appeared in the States, are being watched with interest. It would seem that they find particular use for insertion on long-distance pipelines.

Coke-Oven Projects and Bulk Supply.

The employment of coke ovens in the gas industry constitutes above all a geographical problem. Coke ovens must be for obvious commercial reasons situated between the pit-head, or the port, and the centre of utilization of their product—that is to say, in a metal working district. If the site happens to be in a populous district, the problem is simple, and the metallurgical coke industry merges with the gas industry; but it is still necessary, so as not to increase unduly the production of coke in proportion to the gas, but preserve commercial equilibrium, to heat the settings with producers consuming the small coke as made. Various examples of this practice are to be found in France—for example, the Toulouse Works, situated not far from the mines; the Cokeries de la Seine, in a metallurgical district; and the Alcok de Strasbourg near another big steel centre. Possibly one might find other places where the above solution might be applied; but their number is certainly very limited.

Apart from the replacement of gas works by coke works,

there is another simpler arrangement which is developing rapidly—namely, the partial or total bulk supply of gas-works by the surplus gas from coke ovens. At the moment this is carried out by 35 gas undertakings in France; and the movement, started by the works nearest to the coke ovens, is extending little by little.

We are certainly far removed from the famous project of the Kohlenverwertung, which proposes that Berlin and all the large German towns shall be supplied with coke-oven gas through an enormous network of mains, of which the arteries, about 100 kilometres [62 miles] in length, will link-up the basins of the Ruhr, Silesia, and Westphalia. Such a project must engender an amount of scepticism even in the country of its origin; and indeed it has many weighty problems to tackle, not the least important of which is to ensure a constant supply of gas, even if the coke ovens shut down—by preserving the gas-works intact and in working order, or by some other means.

Big distribution schemes, however, are by no means unknown to the gas industry, in support of which statement is cited the system of the "E.C.F.M.," which encircles Paris and the area of the Paris Company itself. The "E.C.F.M.," from a single works at Gennevilliers and through two intermediate gasholder stations at Boulogne and Alfortville, supplies 105 communes in the suburbs of the Metropolis; and the three arterial pipelines total over 100 kilometres (62 miles) in length—that is to say, they exceed the whole Ruhr basin in extent.

Steel Pipes.

Mention is then made of the growing use of welded steel pipelines, in connection with which the only query which remains to be answered is the life of the tubes and the cost of maintaining them. Two notable high-pressure steel-pipe systems are mentioned—that serving Arras, Albert, and Villers-Bretonneux, which extends for 140 kilometres [87½ miles] and uses pipes of 80 to 125 mm. [3·2 to 5 in.] diameter; and the supply of St. Quentin, Tergnier, Chauny, La Fère, and Noyon, comprising 60 kilometres [37½ miles] of 100 to 150 mm. [4 to 6 in.] pipe. In low-pressure practice, considerable lengths of steel tube have been laid at Chantilly, La Ciotat, Roubaix, Aix-les-Bains, Mulhouse, Tours, and elsewhere.

The Applications of Gas.

While gas appliances and apparatus have undergone considerable improvement, it is recognized that much remains to be done; and though chance may bring notable discoveries to light, yet steady progress will only be effected by patient and methodical laboratory research and tests. The Radiation Central Laboratory is quoted in this regard as "an education and an example."

As for lighting, it is in the streets above all that gas pursues its "glorious career"—of which fact anyone may be convinced by seeing the main arteries of Paris and the suburbs magnificently illuminated, for more than 150 kilometres [93½ miles], with high-pressure gas.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Visit to Margate.

On Saturday, June 11—"Ladies' Day"—the Association visited the Margate Works of the Isle of Thanet Gas Light and Coke Company. Well over a hundred members and their wives and lady friends took part in the outing, which, favoured by good weather, proved most enjoyable. On arrival at Margate, the visitors were conveyed to the gas-works in motor-coaches, where they were cordially received by the Chairman of the Company, Mr. Walter Hills, and by Mr. J. M. Campbell, the Engineer and General Manager, and Mrs. Campbell.

All possible was done by the Directors and Staff of the Company to render the inspection of the works of practical benefit; Mr. Campbell and Mr. T. H. Prater, the newly-appointed Works Superintendent, acting as guides. Mr. Prater is a member of the Association's Council, and was recently awarded the coveted Diploma of the Institution of Gas Engineers for his excellent thesis on "Coal Gas Condensation"—see "JOURNAL" for March 3, 1926, p. 544.

Recent Developments at the Works.

The site of the Margate Works is somewhat cramped; and the story of how Mr. Campbell has reconstructed and extended the carbonizing and general plant to cope with the increasing demand for gas is most interesting. It has been a case of extending in a vertical direction, not only as regards carbonizing plant, but also in respect of storage. In 1913 the Company installed Woodall-Duckham continuous verticals of a carbonizing capacity of 95 tons of coal a day. In 1925 it became necessary to consider the question of extensions; and as a result of the experience gained with the previous installation, the same type was again contemplated. The problem was to obtain the maximum carbonizing capacity in an available house containing inclines; and after discussing various schemes, it was decided to erect a bench of Woodall-Duckham continuous verticals with a major axis length of 103 in. These are the largest "W-D" retorts yet erected; and much interest was naturally displayed by the members of the London Juniors in the inspection on June 11. A full description of the new plant was published in the "JOURNAL" for Jan. 5 of this year. The old inclined house had an output of 200 c.ft. of gas per square foot of ground space per day. The daily output of the new "W-D" plant is 543 c.ft. per square foot of ground space.

Mention has been made of the gasholder extensions. These also have been in a vertical direction, and were carried out by Messrs. Samuel Cutler & Sons, Ltd. An illustrated account of the ingenious reconstruction work, which was carried out in 1923 and 1924, appeared in the "JOURNAL" for Aug. 13, 1924.

The foregoing is sufficient to show that the visit to Margate had been eagerly anticipated by the Association; and that it more than fulfilled expectations indicates how well those responsible had arranged for the inspection. In addition to reprints of articles from the "JOURNAL," Mr. Campbell had prepared a brochure giving a general description of the works and plant of the Isle of Thanet Gas Company; and the following extracts are taken from this.

Historical and General Notes.

The Isle of Thanet Gas Light and Coke Company obtained its first Act of Parliament in 1824, when statutory powers were secured to supply gas to Margate, Ramsgate, Broadstairs, and places adjacent. The power to supply the last-named town was not exercised; and a private Company now exists possessing this authority. Works were established at Margate and Ramsgate by the Isle of Thanet Gas Company; gas being supplied to each town until 1877, when the Ramsgate Corporation obtained Parliamentary powers to acquire that portion of the Company's undertaking within their prescribed area. This led to a severance of the then property into two equal portions, leaving only Margate and District as the Company's sphere of operation. It is not without interest to note that at the time of the separation the Company's make for the two towns was about 118,000,000 c.ft., dropping to 55,000,000 c.ft. (for Margate only) the first full year thereafter, whereas in 1926 the corrected make of gas reached a total of 468,000,000 c.ft., representing an increase of 8½ times in 50 years.

The Company's consumers number close on 10,000, of whom almost 60 p.ct. are supplied through prepayment meters, while there are nearly 6000 cooking stoves and almost 2000 gas heating appliances on hire throughout the district, in addition to a considerable number owned privately. Consumers' burners are maintained on advantageous terms, and a system of general maintenance throughout is about to be considered.

Prior to the prolonged coal stoppage last year, the price of gas to ordinary consumers was 9d. per therm with gas of a declared value of 460 B.Th.U. gross per c.ft. This was temporarily increased last autumn to 11d. per therm, which price, owing to the difficulties from which the Company has not yet fully recovered, still remains in force.

The maximum day's make generally occurs in the height of the summer season, and reached last August 1,756,000 c.ft. Maximum outputs are remarkably similar both at Christmas time and in August, representing 1,727,000 and 1,698,000 c.ft. respectively last year; and other peaks occur at Easter and Whitsuntide. During the season the output of gas on Sunday mornings over the three hours' cooking period represents 35 p.ct. of the total day's consumption, with a maximum between mid-day and 1 p.m. of 15 p.ct.

The works are situated in the heart of the town, occupying an area of only three acres, on both sides of Addington Street. Additional land for manufacture and storage was secured under the Company's Act of 1914 to the extent of 7¼ acres at St. Peter's, some two miles from the existing works and within the area of the Broadstairs and St. Peter's Urban District Council.

Coal (amounting to fully 36,000 tons) required for carbonization is brought by steamers, motor vessels, or barges direct to Margate Harbour. It is unloaded from these vessels by the Company's 5-ton Priestman travelling steam crane, fitted with a Hone grab of about 15-cwt. capacity, into motor lorries, and hauled (under contract) to the works about half-a-mile distant.

Carbonizing Plant.

The carbonizing department consists primarily of four settings of Woodall-Duckham continuous vertical retorts, each comprising two retorts and one producer; the retorts being 25 ft. 5 in. long, and tapering from 8 ft. 5 in. by 10 in. at the top to 8 ft. 8 in. by 1 ft. 6 in. at the bottom. They are unique by reason of their being constructed to carbonize 10 tons of coal per retort per day; and are the only example of their type in operation. They have no regenerators, and are completely fitted up with the latest type of producers, gas off-

takes, double coal feeds, coke extractors and engines, tar overflows, waste-heat boiler, feed pumps, and coke lift, with special steaming facilities of the most recent arrangement. In this house also are four settings of eight inclined Ω retorts, 20 ft. long on the slope and measuring 23½ in. by 15 in. (to 20 in. by 15 in.), set at 32°, fitted with Drake's patent tube regenerators.

There is another installation of Woodall-Duckham continuous verticals consisting of five settings of four retorts each, 25 ft. long and tapering from 3 ft. 10½ in. by 7 in. at top to 5 ft. 3 in. by 17 in. at bottom. This is capable of carbonizing 5 tons of coal per retort per day, and is fitted with the earlier arrangement of regenerators, producers, gas offtakes, coke extractors and engines, seal pots, tar overflows, &c., and waste-heat boiler. At present this installation is out of use, pending being re-conditioned.

Machinery for handling, grading, and storing the coke is at present under consideration.

Condensation, &c.

The gas is cooled by means of two sets of Clapham "Eclipse" water-cooled condensers, each set nominally able to deal with a winter make of 2 million c.ft. per day. Both sets are required during the summer season to maintain an outlet temperature of 60° Fahr. Softened water is supplied to the first set, to avoid furring-up of the tubes, and is utilized after as feed water to the waste-heat boiler, with excellent results.

There is a Keith-Blackman high-pressure compressing set in duplicate, of a capacity of 2000 c.ft. per hour, driven by "National" gas engine.

The gas passes through two Holmes washer scrubbers, each of 2 million c.ft. nominal daily capacity; the first washer being fed with weak liquor.

The purifier installation consists of four boxes (partly new and partly reconstructed), each 40 ft. by 20 ft. by 6 ft. deep, fitted with steel covers and Milbourne patent fasteners and rubber jointing; the whole set being operated by a Pickering valve with 24 in. connections throughout. The covers and the fresh oxide are handled in an interesting manner by a Herbert Morris system of runways suspended from the roof, and the foul oxide is discharged to the revivifying floor underneath through shoots on the bottom plates. There are also two catch-boxes, 40 ft. by 10 ft. by 6 ft. deep, connected up for use either in sequence or alternately, and similarly provided with double inlets and Pickering valve.

Gasholders.

There are only two gasholders. No. 1 is a spiral-guided four-lift holder of a capacity of 500,000 c.ft., and was converted some little time ago from a two-lift column-guided holder. As explained in the "Journal" for Aug. 13, 1924, the special guiding arrangements to suit the old tank are of an entirely new type. No. 2 gasholder is of five lifts, guide-framed, with a capacity of 840,000 c.ft., and was recently enlarged from a three-lift. A boosting set capable of dealing with 50,000 c.ft. per hour against a pressure of 12 in. is installed to maintain the heaviest holder fully inflated at times of greatest demand.

Sulphate of Ammonia and Tar Plants

The sulphate of ammonia plant is capable of making 3 tons of neutral salt per day, and is of the Wilton type, complete with stills for fixed and free ammonia, lime mixer, pumps, Taylor solid lead open saturator, superheater and neutralizing arrangements, and Wilton patent drier. The method of dealing with the waste gases, first by combustion and then by absorption and neutralization, before being passed into the boiler chimney is an interesting feature, as is also the arrangement of the lead-lined gutterways around the saturator leading to the mother-liquor well.

A tar dehydration plant adjoins the sulphate house, and deals mainly with vertical retort crude tar. It is of the lead-bath type—a "T.I.C." plant manufactured by the Woodall-Duckham Company—capable of treating 24 tons of crude tar per day.

Stores, Workshops, &c.

A block of buildings comprises general and oil stores; fitters' shop, with 12 ft. long and 7½ in. centres self-acting surfacing, turning, and screw-cutting gap lathes, also drilling, punching, and shearing machines, and gas engine to operate these; a smithy; and a carpenters' shop. There is also a workshop for the overhaul and cleaning of cookers, fires, radiators, lamps, &c.

All the water used on the works for steam generation—it is drawn from a well near the general offices—as well as to supply the first set of condensers, is softened to zero hardness. This is effected by a "Permutit" plant capable of dealing with 750 to 1000 gallons per hour.

A "Columbus" separator deals with the clinker in the usual way by screening out the smalls, and separating of coke and clinker later through the medium of a clay mixture.

There are some 45 miles of low-pressure gas mains throughout the district, fed with 24-in. and 18-in. main outlets from the works. No mains of less than 4-in. bore are laid.

Public Lighting.

All the gas lamps in the town are of the low-pressure type, and number about 1500. Those along the Front are particularly attractive, being Sugg upright "Littleton" lamps with 9 burners and 5 burners respectively. Elsewhere 3-light clusters and twin-burner lamps are mainly adopted. The lighting, extinguishing, cleaning, and general maintenance of all gas lamps are carried out by the Company (under the supervision of an official Lighting Inspector appointed by the Margate Corporation).

Luncheon.

Following the inspection, the visitors were conveyed to the St. George's Hotel, where they were entertained at luncheon by the Chairman and Directors of the Isle of Thanet Gas Light and Coke Company. Mr. Walter Hills presided, and was supported by several of his fellow Directors.

The Loyal Toast having been honoured,

The Chairman, on behalf of the Directors and Chief Officials of the Company, cordially welcomed the Association to Margate. For several reasons the gathering was of interest. First of all they were grateful to the ladies for gracing the proceedings. Then, in addition to having with them the President of the Association, Mr. Arthur Broadbent, and the two Vice-Presidents, Mr. Leonard Lacey and Mr. W. T. Kenshole, there were present Mr. Samuel Cutler, who was responsible for the erection of the two gasholders, which had given every possible satisfaction, and Mr. F. B. Richards, who represented the Woodall-Duckham Company. The latter Company had erected both installations of vertical retorts at the Margate Works; and these retorts had been eminently satisfactory. He hoped that Mr. Richards would convey this fact to his firm. They also had with them Mr. T. H. Prater, who was a member of the Council of the London Juniors, and had recently obtained the Diploma of the Institution of Gas Engineers. Mr. Prater was now the Company's Works Superintendent; and the Company valued his services. Mr. J. H. Goldsmith, the Hon. Secretary of the Association, was present, and he too had gained the coveted Diploma. Finally, Mr. Hills expressed his pleasure in having with them their esteemed Engineer and General Manager, Mr. Campbell, who, he understood, was really the founder of the Association.

The Association and the Company.

Mr. Arthur Broadbent thanked the Chairman for his welcome. It was particularly gratifying to the members of the Association to find themselves the guests of the Isle of Thanet Gas Light and Coke Company, for the Engineer and General Manager, Mr. Campbell, was responsible for the founding of the Association, which owed its inception to his letter to the Technical Press in 1902. They were not strangers to Margate, for the Directors of the Company had entertained them there in 1912. They had seen on their present visit the many changes which had been effected in the works, and they had been impressed by the efficient manner in which Mr. Campbell, with such little ground space at his disposal, had adapted the works to meet the increased consumption of gas. By installing the Woodall-Duckham plant of a capacity of 10 tons a day, he had trebled the output of the corresponding ground space formerly occupied by the inclines. Mr. Broadbent said how indebted the members of the Association were to the Chairman and Directors of the Company for their hospitality.

Mr. Leonard Lacey, the Senior Vice-President, in proposing a vote of thanks to the Chairman and Directors of the Isle of Thanet Gas Light and Coke Company, and to Mr. Campbell, commented on the close relationship between the Company and the Association, and referred to the pleasure it gave them to have Mr. Prater on their Council. Mr. Lacey said how glad the members were to see Mr. W. J. Liberty and Mr. P. F. Scarth present. Inspection of the Margate Works had enabled them to appreciate the fact that extensions there had to be in a vertical direction. The results of the new vertical plant fully justified the choice made; and the manner in which the gasholders had been reconstructed was most ingenious.

Mr. W. T. Kenshole, the Junior Vice-President, seconded the proposition.

The Chairman and Mr. Campbell expressed their thanks. The latter said how pleased he was to see Mr. Scarth and Mr. Liberty, the work of both of whom for the Association was splendid. Though Mr. Liberty had resigned from his post as Superintendent of Public Lighting of the City of London, he was Hon. Secretary of the Institution of Public Lighting Engineers—a body which, though young, had already accomplished useful work. They were holding their annual meeting in Brighton in October, and the Corporation of Margate, by sending the Chairman of the Lighting Committee and the Public Lighting Superintendent, were associating themselves with that meeting.

Early Days of the Association.

Mr. Liberty spoke of the early days of the Association, when the meetings were held at the Polytechnic, and of the persevering manner in which Mr. Campbell had tackled the task of developing the Junior Association. He (Mr. Liberty) had noted that the extinguishing and maintenance of the public lighting in Margate was carried out by the Company, under the supervision of the Public Lighting Superintendent. This was an excellent system; and recently the Chairman of the Lighting Committee had told him how good was the lighting of Margate.

Mr. Scarth, the first Hon. Secretary of the Association, in the course of a few remarks, said that it was through Mr. Campbell's energy that the Association came into being. In fact, they owed everything to Mr. Campbell.

At this stage Mr. Broadbent intimated that on that day Mr. Goldsmith handed-over the office of Hon. Secretary of the Association to Mr. Arthur Tennant, of Croydon.

A few remarks from Mr. Samuel Cutler and Mr. F. B. Richards (of the Woodall-Duckham Company), both of whom expressed their appreciation of the benefits which accrued from the meetings of Junior Associations, concluded the proceedings.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Advertising Methods of Mr. George Helps.

SIR,—Owing to the appearance of an advertisement in the "Nuneaton Chronicle" of May 27, 1927, I think the time has come when I must publicly dissociate myself from the methods of advertising adopted by Mr. George Helps, in which he makes use of my name without my permission. On a previous occasion I made protest through an intermediary when Mr. Helps published in the "JOURNAL" a letter in which my name was coupled, without warrant, with certain test figures.

The recent advertisement referred to is published under the heading "Public Notices," and contains the following:

> TOWN GAS SUPPLY.—To the large industrial users of gas and all others interested in the general trade of the country. The present price of town gas in the largest cities to users consuming into the teens of millions of cubic feet per annum is in the neighbourhood of 9d. per therm.
>
> Such a price—whatever may be said of it for small users—it is not unfair to consider as most exorbitant for users of enormous quantities, and points to costly methods of production and distribution.
>
> Taking as a basis of selling price . . . the total selling price of gas delivered to the large consumers' premises could not reasonably be any more than $\frac{480}{2.0} = 2.4$d. per therm.
>
> If there is any doubt of the fact that 200 therms can be produced from a ton of local coal, write to:
>
> Dr. W. B. Davidson, 12, Akenside Hill, Newcastle-on-Tyne. Dr. Davidson is: A Master of Arts, a Doctor of Science, a Doctor of Philosophy, and a Fellow of the Institute of Chemistry. He was Chief to the Birmingham Gas Department (the third largest works in the country) for about six years, and subsequently was Engineer in charge of one of their largest stations for a considerable period.
>
> He is in a position to give particulars of actual results obtained under his direction at Nuneaton recently.

My sole purpose in writing is to call the attention of my professional colleagues to the fact that the above is an unauthorized and, one might be inclined to say, impertinent use in a trading announcement of my name and position.

W. B. DAVIDSON.

Tynemouth,
June 11, 1927.

Flat Gas Pipes.

SIR,—In reference to the paragraph on p. 624 of the "JOURNAL" for June 8, the difficulty mentioned can be met by simpler means than a rivetted rectangular section. Makers of steel tubes will flatten them to an elliptical section, at a very moderate extra charge per length, if necessary reducing the conjugate diameter to near one-half of the original. Two such pipes in parallel will be equivalent to the rectangular with central supporting beam. Steel pipe can now be obtained up to 40 ft. in length, so a bridge not exceeding that figure can be traversed by one pipe, avoiding a joint or joints on the crossing—an important consideration in view of the additional strain on bridges caused by modern motor lorry and chars-a-banc traffic. An extended experience with flattened pipe shows no reason for supposing the tensile strength of the metal to be affected, but, of course, elliptical section laid flat is not equal in supporting strength to the equivalent circle. If the clearance is uncommonly small, permission may be obtained for raising the footwalk a few inches. By means of this expedient, a flattened 8-in. or 10-in. pipe enclosed in concrete or granite tar asphalt can be successfully carried over a very small clearance.

N. H. HUMPHRYS.

5, Wyndham Road,
Salisbury,
June 13, 1927.

The Future of the Gas Industry.

SIR,—Sir Alfred Mond, in his recent address to the members of the new Institution of Fuel Technology, referred to the accountancy adopted by auditors, accountants, and others, and threw out the hint that possibly the methods adopted were not quite modern enough for present-day needs.

We have before us the work and thoughts of Henry Ford of mass production fame in America and the world, and following in his footsteps Mr. Morris, of motor fame in this country.

With such methods as have been adopted by these two captains of industry—to say nothing of others—there cannot be much doubt that accountancy does call for inquiry. Be that as it may, there is no advantage in discussing the question in the abstract; and so we may proceed to discuss one phase of it as applicable to the gas industry at the present moment.

The aspect of accountancy that we refer to is that which would be generally considered to come under the heading of standing charges. There are people in the gas industry who consider, and therefore make their annual statement of accounts show, that gas of 450 to 500 B.Th.U. costs 6d. per 1000 c.ft. to distribute, and that gas of 220 to 250 B.Th.U. would cost just double, or 1s. per 1000 c.ft. This is roundly our text.

Now how are the costs of distribution calculated? They are based on two main factors, as given below—1 and 2. Capital charges are obviously concerned, but such can be best applied by taking the whole capital employed for all purposes. Any division is difficult.

1. The cost of repairs and maintenance of mains and services.
2. The cost of free work in attending to consumers' complaints, &c.
3. Capital charges.

Each of the factors 1 and 2 requires to begin with an entirely different application of thought. After this preliminary thought, and each is separately understood, they may be combined at will.

With gas of 450 to 500 B.Th.U. distributed at (say) 8d. or 9d. per therm, the total cost of repairs and maintenance of mains and services is divided by the total number of therms sold in any year. In other words, if the said costs are (say) £3000, and the sales 500,000 therms, the cost is $\frac{3000 \times 240}{500,000}$, (say) 1·5d. per therm, which is near enough to 6d. per 1000 c.ft. for the gas.

Now when selling gas at 9d. per therm at any particular period in a particular gas undertaking's history, there is a limit to the therms that can be sold, which limit depends to a considerable extent on the purposes for which gas can be used at such price both industrially and in the household. It is assumed that the town gas undertaking under discussion is both residential and industrial.

Let it be assumed that the selling price of gas without altering the existing method of manufacture (this does not concern the argument at the moment) is reduced to 4d. per therm. The uses to which gas can be put in competition with other fuels are now considerably augmented automatically, so to speak, through price, with the result that in a short time twice or even three times the therms are sold annually. Take the case of twice the sale to roundly the same number of consumers, with the same number of mains and services. The effect of twice the sale is that the costs of mains and services are halved, and the figure becomes 0·75d. per therm, or (say) 3d. per 1000 c.ft. If three times the sale, the cost would be 0·5d. per therm, and so on.

This reasoning will be later applied to show that low-grade gas when sold, as it can be sold, at a much lower rate than richer gas would in effect reduce the costs of distribution.

Let us allow our reasoning to carry us a little further. Accept as a fact (which it is) the proposition that processes of gas manufacture could be so improved that the majority of works in the country could sell gas at a flat rate of 4d. per therm. Low-grade gas would certainly allow this. Then the proposition is proved that low-grade gas would halve the costs of distribution of gas on a therm basis compared with rich gas of 450 to 500 B.Th.U. So much for point No. 1, cost of mains and services.

Now let us consider the costs of free work attending to consumers' complaints, &c., as well as any other work at present done free, together with capital charges. Very little need be said about the costs of free work. Keeping appliances in order increases their use and pays for itself. It is well known that, however great or small the consumption of a domestic consumer, the charge of laying mains adjacent to his abode, and connecting services, and the general attention embracing free work he must be given, is broadly the same whatever the business done with him in the shape of gas sales. It will be well here to take an actual example of ordinary charges somewhat on the high side, so that the figures used may be trustworthy. Here are the charges covering those referred to under 1, 2, and 3.

Distribution, Rates, Management, and Profit.

Repairs to mains and services, &c.; repairs to meters and cookers, &c.; all office expenses, clerk's salaries, &c.; directors' fees; rents, rates, and taxes, including income-tax not deducted from profits; gross profit; depreciation and capital charges £12,000

In this case there are (say) 6000 consumers; and, as is seen, all the charges embraced in items 1, 2, and 3 amount to £12,000, so that a charge which produced for the service an average yearly income of £2 per house would cover everything but the cost price of the gas. If the cost price of the manufacture *less* residuals is 3d. per therm, an annual average rental of £2 per house for the service and 3d. per therm would suit the gas consumer infinitely better than a high flat charge for the gas, and would suit the gas undertaking infinitely better also. For example, the cost of gas to the small consumer using 100 therms per annum would be: 100 at 3d., 25s. + £2 = £3 5s., or $\frac{780}{100}$ = 7·8d. per therm, which, it is seen, includes (preferably so) meter rent, stove rent, &c. Even this small consumer, if charged for gas in this manner, would realize that for a further sum of 25s. he could burn just twice the quantity of gas. The larger consumer using 1000 therms per annum would pay £12 10s. *plus* (say) £4 for his service = £16 10s., or $\frac{3960}{1000}$ = 4d. per therm.

The special feature of attraction of this present charge proposal is that the consumer, instead of having to reckon that each therm of gas cost him by present methods of calculating and fixing price (say) 8d., would find that it cost him only 3d., at which price he could afford to use gas for every domestic requirement, because it would be considerably less costly than coal. In other words, the proposed method of charging encourages the use of gas, while the present method discourages its use—a very big difference.

Various means of collecting the service rate will suggest themselves to a student of this present proposal. The ideal method perhaps would be where the owner of the house supplied undertook to pay an annual rental for his tenant, and charge it in the rent and pay the

gas company quarterly. Where corporations are concerned, probably some method of collecting the 1s. per week with the rates would suggest itself. Be that as it may, 1s. per week, or £2 12s. per annum, would cover everything the ordinary consumer required. Coal would be ousted from its rule so far as the ordinary grate is concerned.

Now as to the price at which gas could be sold generally. Mr. Robert McLaurin, of Glasgow, who was associated with the late Sir George Beilby for a matter of twenty years, and whose experience in the distillation of shales, &c., was only second to Sir George Beilby's, proposed a method of distillation or carbonization of coal in producers whereby coke would be made. This proposal was made eight or ten years ago. Imagine it, Ye Gods of the Gas Industry! How many of you know that? How many of you know it now? How many of you who do know it realize half of its significance? Not only can an excellent coke be produced, but it can be produced from non-caking coals, together with rather over the usual or average quantity of gas produced on gas-works at the present moment per ton of coal, and about double the oils.

Probably only those people who can measure the significance on costs of gas of producing coke, &c., in a producer are those with actual experience of producer practice—and they are few. Here is the point of the story. If Mr. McLaurin is provided with coal of a reasonable type delivered to the gas-works at (say) £1 per ton, he will undertake to produce gas for 2d. per therm. This is no myth. There is a plant to be seen by all who apply for permission to do so in which 50 to 100 tons of coal per day is being carbonized for the purposes indicated, and gas is being produced at less than 2d.

The quality of the gas is about 250 B.Th.U.; and those who—in their ignorance it may be said—require a richer gas than this can have it as well as those who require a lower quality. As is fairly well known, 200 gas is being distributed and used at Nuneaton with daily increasing success.

Here then, Mr. Editor, is in sight gas at something like 2d. per therm to the consumer if he pays a nominal sum for the cost of being connected to the suppliers' system, including the contractor's obligation to provide the essence of coal in the form of gas through a pipe at all hours of the day or night. How far will raw coal at 20s. per ton compete with gas at 2d. per therm?

Hats off to Mr. Robert McLaurin, and long life to him!

The foregoing proposal for gas charges has been brought about through an interesting discussion with Bailie William B. Smith, of Glasgow. He has set his heart on a smokeless Glasgow; and it seems that with low-grade gas the solution lies now at his feet.

GEORGE HELPS.

Nuneaton, June 11, 1927.

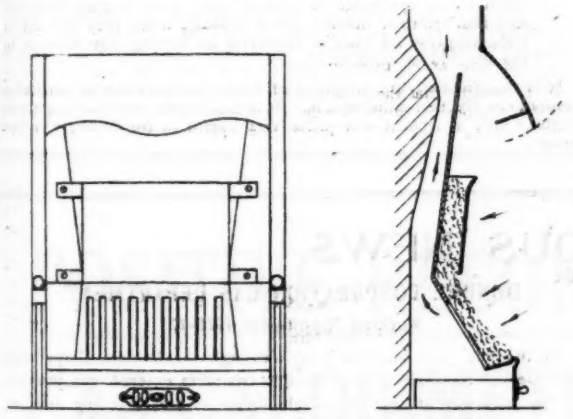
REGISTER OF PATENTS.

Open Grate for Burning Coke.—No. 270,476.

TOOBY, C. F., and LANGFORD, P. N., both of Coventry.

No. 10,308; April 20, 1926.

This invention refers particularly to that type of open coke-burning grate in which the fuel is burnt on inclined firebars and the air for combustion passes downwardly through the fuel into a space communicating with a flue which extends up behind a false back-plate into the chimney; the rate of combustion being controlled by admitting air to the space below the firebars or by varying the effective area of the bars.



Domestic Coke Grate.—C. F. Tooby and P. N. Langford.

The object of the invention is to provide an improved grate of this type which can be readily fitted to an existing fireplace, and in which the draught is under very complete control, so that the fire is easily started and the rate of burning can be varied as desired.

The invention comprises inclined firebars to support the fuel, and a back-plate extending upwardly from the firebars towards the chimney opening. A flue behind the back-plate establishes communication between the chimney and the underside of the firebars, and a swinging canopy is adapted to close or to restrict to any desired extent an opening to the chimney above the fire. A closed ashpan with an adjustable opening or openings in its front is adapted to control the entry of air to the underside of the firebars except through the bars themselves. By this means the whole or any desired proportion of the air entering the chimney can be caused to pass through the layer of fuel on the firebars, and the temperature of the gases in the chimney can be maintained sufficiently high to give the necessary amount of draught to consume the fuel with incandescence and a high degree of radiant efficiency. The rate of combustion can be controlled by opening or closing the canopy and adjusting the openings in the ashpan. When lighting the fire, these openings are closed and the fire can be easily and quickly lighted with paper, wood, and coke; and the fuel bed is brought into incandescence in a very short time.

By means of a fuel hopper arranged in the known manner against the back-plate above the firebars, the grate may be made self-feeding, and will burn continuously for prolonged periods without attention.

We reproduce an elevation and section of the grate.

Cooling of Coke.—No. 270,780.

COLLIN & Co., of Dortmund.

No. 1149; Jan. 14, 1926.

In the method for cooling coke by passing gases therethrough according to the present invention, air or gas containing sufficient oxygen for the combustion of combustible gases formed in the cooling chambers is added to the gases leaving the chambers, prior to their passage through heat-utilizing or exchanging apparatus. Combustion thus takes place, and CO is converted into CO_2, so that the gases re-enter the cooling chambers free from CO, and the precipitation of carbon in the cooling chambers is avoided. Use is thus made at the point of utilization not only of the sensible heat, but also of the heat of combustion, of the combustible gases.

It is preferable that the combustion of these gases should take place in a separate chamber situated before the point of utilization of the heat, or, if at the point of utilization, that it should be effected by means of preheated combustion air, which may also be used in the first case.

During the passage of the cooling gases through the glowing coke, steam or water may be added to the gases; the precipitation of carbon in the cooling chambers being counteracted, and the coke being desulphurized. In this case, according to a further feature of the invention, the circulation of the gases may be effected by the steam introduced by an injector.

Other features of the invention are also described and claimed.

Atomizers.—No. 270,814.

SUGG & Co., LTD., and SUGG, P. H., both of Chapter Street, S.W. 1.

No. 4298; Feb. 15, 1926.

This invention relates to gas atomizers such as are commonly employed to ensure an intimate mixture of gas and air flowing to the burners of gas fires, and particularly of the type comprising a plate having a plurality of perforations or passages through which the gas flows.

The object of the invention is to provide an efficient atomizer which is cheap and easy to manufacture. Accordingly it is formed of a strip of material wound upon itself, the spacing between the folds of the strip material (or between the plurality of strips) being formed by a strip of material such as gelatine, celluloid, or lead, which can be removed by dissolving, melting, or burning after assembly.

In carrying out the invention, the "roll" is placed within and secured to a tube or barrel by pins or the like; the pins passing through the strips forming the spiral. The celluloid or gelatine is then dissolved in any convenient manner, leaving passages between the convolutions of the metal strip; and the pins maintain the spacing of the convolutions.

It is claimed that such an atomizer possesses the advantage, if the metal strip employed be thin, that the back pressure is small.

Gas Fires.—No. 270,815.

SUGG & Co., LTD., and SUGG, P. H., both of Chapter Street, S.W. 1.

No. 4299; Feb. 15, 1926.

This invention relates to this well-known firm's "concave" fire; the main claim being for "the combination of a fire brick which is made concave, a frame supporting said fire brick, vertical tubular radiants supported by said frame and arranged in a curved formation corresponding to the curvature of the fire brick, and means for supplying a combustible mixture to said radiants."

Features are the staggered pyramidal projections on the back brick, and square-base pyramidal projections on the radiants. The atomizers, which are the subject of the preceding specification, are also incorporated.

Dinner by Falk, Stadelmann & Co., Ltd.—A dinner was given on Friday, June 10, at Stanley's Restaurant, Clapham Junction, by the Directors of Falk, Stadelmann & Co., Ltd., to the Veritas Athletic Club, in celebration of the winning by the Football Section (the second time within three years) of the Group A and Divisional Championship Cups of the Balham and District League. The League medals were presented to the members of the winning team by Mr. Max Falk, Chairman of the Company.

LEGAL INTELLIGENCE.

RAILWAY RATES.

COURT OF APPEAL—APRIL 27 TO MAY 3.

National Gas Council of Great Britain and Ireland
v.
London and North-Eastern Railway Company, London, Midland, and Scottish Railway Company, Great Western Railway Company, and Southern Railway Company.

A short time ago, the National Gas Council were authorized by the Central Executive Board to appeal against the judgment of the Railway Rates Tribunal with regard to the proposed new schedules of standard charges put forward by the Railway Companies. The Court by whom the appeal was heard comprised Lords Justices Atkin, Scrutton, and Banks. In delivering judgment, Lord Justice Atkin stated that he thought the case was one of overwhelming public importance; but in regard to any immediate results that were going to follow from any decision arrived at by the Court, they were *nil*, because it had been made quite plain that the Court should not do anything which would disturb the schedules which the Railway Rates Tribunal had provisionally accepted as being the schedules of standard charges for the trial, or "A," year. Therefore, whether the Tribunal were right or wrong in law in the way in which they approached the case, it would make no difference, and the schedule of charges as it stood would be the schedule that would be brought into force for the trial year. Therefore it became, to his mind, relatively unimportant to consider whether the Tribunal were in fact right or wrong. What was much more important was to determine what the true principles were on which they ought to have acted.

The judgments are of an extensive character, and have been reported in full in an appendix to the April Monthly Report of the National Gas Council. In the report itself, there is a brief indication of the result of the appeal; and permission has been obtained to reprint this in the "JOURNAL." It is as follows:

The Council's appeal came before the Court of Appeal on April 27. While the Council have not been successful in obtaining a clean-cut victory, they have achieved the results which they set out to obtain—namely, of safeguarding the position of the gas industry in connection with future applications for revision of standard charges under section 35, or when standard or exceptional charges are periodically reviewed by the Tribunal under section 59 of the Railways Act, 1921.

The Court of Appeal upheld the three contentions put forward by the Council, but found themselves unable to say that these were pure questions of law. As an appeal will only lie on questions of law, the Court were unable to grant the appeal; but seeing that the Council were, in the opinion of the Court, fully justified in appealing, they refused to give costs to the Railways.

The Council submitted that the judgment of the [Railway Rates] Tribunal was wrong in three respects:

First, in that it stated that it "was not within the powers" of the Tribunal to standardize the Exceptional Rate position.

With regard to this point, all three Judges have decided that the Tribunal have the power to standardize the Exceptional Rate position, and that the judgment, in making a statement to the contrary, was erroneous. The Court, however, were inclined to the view that the statement in the judgment was a slip, and could not be held to amount to a misdirection in law.

The second submission of the Council was that Standard Charges for Coal should be charges at which coal can, and will, normally be carried, and not mere notional charges comparable only to the old maximum powers fixed by the Railway Rates and Charges Orders, 1891.

With regard to this point, both Lords Justices Scrutton and Atkin criticize the action of the Tribunal. Lord Justice Scrutton particularly states that, when the Tribunal review the Standard and Exceptional Charges at the end of the first year, as they are compelled to do, "they will do much better if they do fix a standard rate which has some relation to the circumstances under which the greater quantity of coal is carried."

The third submission of the Council was that the principle of the "maintenance of the relativity of charges"—a principle propounded by the Railways and adopted by the Tribunal—was erroneous, and should not remain unchallenged.

With regard to this point, all three Judges state that the relativity of charges had nothing to do with the duties of the Tribunal. This is made abundantly clear in the judgments of Lord Justice Scrutton and Lord Justice Atkin. Lord Justice Scrutton stated as follows:

"I cannot help thinking that whoever is the proud author of relativity as applicable to railway rates made a great mistake, and the Tribunal made a great mistake when they did not at once suppress all idea of relativity as having any relation to the matters in question."

It is thought that the judgment of Lord Justice Atkin in particular sets-out the position quite clearly. It is considered that the judgments of the Court of Appeal will prove very useful to the industry in the future.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

SPECIAL ORDER.

Weston-super-Mare Gas Light Company.

To extend the existing limits of supply, and to make provisions for differential prices in the added area.

DECLARATION OF CALORIFIC VALUE.

Brodsworth and District Gas Company.—475 B.Th.U., in substitution for 500 B.Th.U. (Oct. 1.)

NATIONALLY VITAL GAS INDUSTRY.

A blow at the nationally vital gas industry such as the new electricity scheme will strike if it be unduly pushed will, says Mr. E. T. Good, writing in the "Yorkshire Telegraph and Star," be a crime against the common good; and it is therefore to be hoped that manufacturers and householders will display more sense in their choice between gas and electricity than Parliament displayed when it carried the Electricity Bill.

In the course of his article, Mr. Good remarks that it has yet to be proved that electrical power is cheap where water is scarce and coal is abundant. Again, compared with gas, electricity is a coal waster; and if an undue number of manufacturers and householders are persuaded to use electricity and discard gas, how are the essential bye-products at present supplied by the gas-works to be obtained? The gas industry not only delivers to the final consumer 22·5 p.ct.* of the heat value of the coal consumed, but it yields just about 50 p.ct. of coke, and considerable percentages of valuable bye-products. Against that the electricity industry only delivers to the final consumer 12 units out of 100 of the coal consumed; and even on behalf of the promised super-power and nationally-organized scheme it is not claimed that more than 18 or 20 units can be delivered—a claim which has yet to be made good. Bye-products, too, do not enter into the loudly-boosted scheme at all. At a pithead gas plant, using very inferior coal, we obtain 14 cwt. of solid smokeless fuel, 6000 c.ft. of gas, 17½ gallons of oil, and 18 lbs. of chemicals, per ton of such inferior coal carbonized. From a modern gas plant using coal of good quality we get 10 cwt. of smokeless fuel, between 14,000 and 15,000 c.ft. of gas, 10 gallons of tar, which in its turn yields several bye-products, and 25 lbs. of chemicals, some of them of high value.

* This figure is, if anything, rather on the low side.—ED. "G.J."

DUNDEE CORPORATION GAS DEPARTMENT.

Working Results for 1926-27.

During the past financial year, although the Dundee Corporation Gas Department had to buy, outside contracts entered into previous to the stoppage at the favourable figure of 19s. 3d. per ton, no less a quantity than 39,000 tons of American and Silesian coal at 56s. 9d. per ton, and 6400 tons of home coal at 45s. 7d., the gas supply was maintained at a high pitch of efficiency throughout. The Department was not left at the end of the period with any more than a week-end of coal, after starting-out on May 1 with 18,000 tons, equal to from ten to eleven weeks' gas requirements. The following is a brief summary of the working results:

—	1926-1927.	1925-1926.
Gas produced	1,764,110,747 c.ft.	1,734,803,100 c.ft.
Gas accounted-for	1,623,504,100 c.ft.	1,545,629,200 c.ft.
Tons of coal carbonized	105,719¾ tons	109,050 tons
Gas produced per ton of coal	16,686 c.ft.	15,908 c.ft.
Coke " " " "	10·21 cwt.	11·46 cwt.
Tar " " " "	11·37 galls.	15·52 galls.
Sulphate of ammonia produced per ton of coal	23·70 lbs.	25·72 lbs.

The increased amount of gas produced per ton of coal is due to the more extended use of water gas during the stoppage. Coke, tar, and sulphate of ammonia production all show considerable decreases compared with a normal year's working, owing chiefly to the nature of the Silesian coal handled, most of which was of low quality compared with Scotch coal. The American coal, however, compared favourably with the best home coal; but its very high coking qualities gave considerable trouble in working the vertical retorts, with consequent higher labour charges and lower production per retort. A satisfactory feature of the accounts is the large decrease in the amount of unaccounted-for gas. The increased gas sales amount to 78 million c.ft.

The maintenance of appliances scheme, from which a full year's work has now been obtained, at a cost of £3400, is already showing the effect of systematic attention bestowed upon consumers' appliances in an increase of business, accompanied by a substantial percentage decrease in the number of complaints as to deficient supply

of gas. It can already be said that the scheme will more than pay its way in the obtaining of new business and the retention of old with increased satisfaction on the part of the gas consumer.

Considerable extensions of plant have been, or are now in process of being, carried through to meet the requirements of the Department for several years ahead. The assistance given to the management during the period by the officers and workmen of the Department has been of such a nature as to lighten a year of extraordinary happenings—a year which has left by way of profit nothing except an optimistic outlook founded upon the manner in which the difficulties of the situation were overcome.

Submitting the accounts to the Town Council, Treasurer Johnston said the net result of the year's working was a loss of £19,609, which, added to the debit balance of £13,286 brought from the preceding year, made a total of £32,895 to be carried forward. It was proposed to reduce the price of gas 8d. per 1000 c.ft. If the estimates were realized, the debit balance should be replaced by the end of this year by a small credit balance.

Replying to a question, Mr. James Dickson (the Engineer and Manager) said the general strike and coal stoppage cost the Gas Department about £75,000.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

There has been no change in market conditions, and another dull week has been experienced. There was some activity to complete shipments to France before the license system, imposed by the French Government, came into force. These, however, did not represent much new business, but were mostly on account of previous sales. It remains to be seen what the result of the system will be on English exports of coal to France.

There is very little inquiry of any kind, and quotations are maintained only by restriction of output, which is inevitable in view of the already unpayable level of current prices. Idle time is widespread through both counties, and, what is still more serious, several large collieries have found it necessary to issue notices to their men, which, of course, means the total closing of pits for an indefinite period.

Wear Special and best quality gas coals are nominally 16s. 6d. to 17s. f.o.b., other qualities being weak at 14s. to 14s. 6d. Durham unscreened coking is 14s. to 14s. 6d. Ordinary unscreened bunkers are 14s. to 14s. 6d., and best makes quote 15s. 3d. to 15s. 6d. Northumberland screened steams show no improvement; best qualities being no better than 14s. 6d., and short of trade at even this figure.

Demand for coke of all descriptions is slack. Gas makes for shipment ask 19s. 3d. to 19s. 9d. f.o.b.

YORKSHIRE AND LANCASHIRE.

The coal markets in Yorkshire and Lancashire, in common with the rest of the country, continue to be depressed. It is felt, however, that prices have reached such a low level that buyers will now show more inclination to fix up for their requirements. This applies more particularly in regard to foreign business, rather more inquiries having been received of late. The average price for this trade is 18s. 6d. per ton.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports: South Yorkshire—Hards, Association, 15s. 9d. to 16s.; screened gas coal, 16s. to 16s. 6d.; washed trebles, 16s. to 16s. 9d.; washed doubles, 15s. 9d. to 16s.; washed singles, 15s. 3d. to 15s. 9d.; washed smalls, 14s. 3d. to 14s. 6d.; rough slack, 13s. 3d. to 13s. 9d.; smithy peas, 18s. to 19s. per ton. West Yorkshire—Hartley's (f.o.b. Goole), 14s. 9d. to 15s. 6d.; screened gas coal, 15s. to 16s.; washed trebles, 15s. to 16s.; washed doubles, 15s. to 16s.; washed singles, 15s.; washed smalls, 13s. 9d. to 14s. 3d; unwashed trebles, 14s. 9d. to 15s. 6d.; unwashed doubles, 14s. 6d. to 15s.; rough slack, 13s. to 13s. 6d.; coking smalls, 12s. 6d. to 13s. per ton. Derbyshire and Nottinghamshire—Top hards, 16s. to 19s.; washed doubles, 16s. to 16s. 6d.; washed singles, 16s. to 16s. 6d.; washed smalls, 14s. to 15s.; unwashed doubles, 15s. to 16s.; rough slack, 13s. to 13s. 9d. per ton. Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, 14s. 6d. to 15s. 6d.; gas coke, 21s. to 25s.; furnace coke, 17s. 6d. to 18s. per ton.

Quotations in Lancashire include: Best Lancashire house, 33s. to 34s.; seconds, 30s. to 31s.; common, 19s. to 21s.; kitchen coal, 23s. to 24s.; Yorkshire Haigh Moor, 33s. to 35s.; best Yorkshire house coal; 30s. to 31s.; common, 18s. to 20s.; washed doubles, 16s. to 16s. 6d.; washed singles, 14s. to 15s.; rough slack, 14s. to 15s. into wagon at the pit.

MIDLANDS.

The market remains very lifeless. With intensified competition between the collieries business has become more localized. Consumers will pay only minimum rates, except in the case of special qualities, which means that transport cost is the determining factor.

Unemployment is more widespread. Many of the pits are working half time or less, and official returns indicate that the new basis of costs has not given economic stability to the industry.

There is not much change in the general level of quotations. Spot lots are to be obtained at very low rates, and the tendency is further to depress the market as a whole, and to make collieries less stiff in their adherence to schedule rates.

Cokes are plentiful, and prices squeezable.

POSITIVE RECORD

GAS CALORIMETER

(Simmance's Patent)

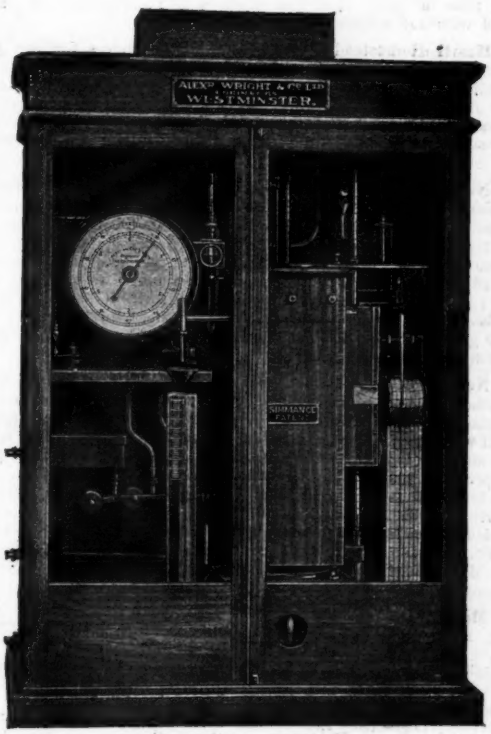
ACCURATE

No Water Troubles.

CERTAIN for a LONG RUN without attention.

A PERFECT TEST INSTRUMENT.
A PERFECT RECORDING MACHINE.
AN AUTOMATIC TESTER.

Maintenance Expense Avoided.



ALEXANDER WRIGHT & CO., Ltd., Westminster, S.W.1

Telephone: VICTORIA 1207. Telegrams: PRECISION, SOWEST, LONDON.

TRADE NOTES.

Gasholder Contracts of Messrs. Firth Blakeley, Sons, & Co., Ltd.

In addition to the gasholder contract for the Haslemere and District Gas Company, secured by Messrs. Firth Blakeley, Sons, & Co., Ltd., of Vulcan Iron-Works, Church Fenton, which was referred to in our issue of the 1st inst., this firm have also gasholder contracts at present on hand for the Portishead Gas Company, the Helston Corporation Gas Department, the Brightlingsea Gas Company, the Waterford Gas Company, the Harrington Urban District Council Gas Department, the Sowerby Bridge Urban District Council Gas Department, the Gringley Gas Company, &c. They are also engaged on purifier, condenser, and other installations of plants, at numerous works.

CONTRACTS OPEN.

Coal.

The Evesham Corporation are inviting tenders for the supply of gas coal. [See advert. on p. 700.]

Tar.

The Directors of the Littlehampton Gas Company are inviting tenders for the purchase of their surplus tar. [See advert. on p. 700.]

Gas Finances at Workington.

As from the next reading of the meters, the price of gas is to be reduced at Workington by 4d. per 1000 c.ft. Reviewing in the Town Council the past financial year's working of the Gas Department, Alderman F. Hall (the Chairman of the Gas Committee) said that, as compared with 1926, the make was 12½ million c.ft. less; but it took 281 tons more of coal to produce it. This, of course, was because they had to use what they could get to keep going after the first three months of the stoppage. It spoke volumes for the Woodall-Duckham vertical retort plant, and for the staff and workmen, that they pulled through, with all the strange coal they had to use. The net financial result of all the thought and labour expended was a loss of £4333, due entirely to the increased cost of coal, for which they had had to pay £6830 more. The Engineer and Manager (Mr. Hedley Hoy), in his report, stated that the increase for the year in the number of consumers was 310. Of the total gas registered, 51·28 p.ct. was supplied through ordinary meters, and 48·72 p.ct. through prepayment meters. The average annual consumption per ordinary meter (apart from power users) was 26,603 c.ft., and per prepayment meter 17,534 c.ft. The gas made per ton of coal carbonized was 18,472 c.ft., or 77·4 therms; the average calorific value of the gas supplied being 419 B.Th.U.

Llandudno Gas-Works Results.—The annual returns submitted to the Llandudno Urban Council by the Gas Manager show that for the year ended March 31 the coal carbonized was 8287 tons, against 6994 tons in 1926. The gas made was 154,012,000 c.ft., as compared with 148,498,000 c.ft.

Hemel Hempstead Capital Issue.—The tenders for the £14,000 of 6 p.ct. preference stock which Messrs. A. & W. Richards offered on behalf of the Directors of the Hemel Hempstead District Gas Company ranged from £100 down to the minimum of £93 per £100; the lowest successful tender being at £95. The issue was considerably over-subscribed; and the average price obtained for the stock was £95 2s. 4d. per £100.

New Scale of Charges at Leek.—The Leek Urban District Council have decided to introduce a new scale of charges for supplies of gas. The new prices are as follows: For the first 20,000 c.ft. per quarter 3s. 9d. per 1000 c.ft.; over 20,000 and up to 35,000, 3s. 7d.; 35,000 to 50,000, 3s. 5d.; 50,000 to 70,000, 3s. 3d.; 70,000 to 100,000, 3s. 1d.; 100,000 to 150,000, 2s. 11d.; 150,000 to 200,000, 2s. 9d., less 12½ p.ct. discount for accounts paid within one month. Over 200,000 c.ft. per quarter, by special agreement. Slot meters in Leek to be granted a discount of 5d. per 1000 c.ft. for the current quarter's consumption, and Rudyard slot meters a discount of 4d.

Nelson Gas Accounts.—Mr. James Mitchell, Engineer and General Manager of the Borough of Nelson Gas Department, reports for the year ended March 31, a gross profit of £19,546, and a net profit of £3582. The quantity of gas made was 609 million c.ft., and the amount delivered 608½ millions—an increase of 10·4 p.ct. on the previous year. The unaccounted-for gas was 3·77 p.ct., as compared with 6 p.ct. a year ago. There are now 16,425 consumers, of whom 9782 are provided with prepayment meters. It has been decided to reduce the price of gas at the end of the present quarter by 6d. per 1000 c.ft., thus reverting to the pre-stoppage charge; and Mr. Mitchell is at present looking forward to a record profit-making year.

Meters, Ltd.—The accounts for the year ended March 31 show that, after providing for interest on debenture stock, general management expenses, directors' fees, legal charges, expenses on patents, income-tax, repairs and renewals, depreciation upon buildings, machinery and plant, &c., the net profit amounts to £19,828, which, added to the balance of £752 brought forward, gives a total of £20,580. Deducting the interim dividends paid in November last, the sum now available for appropriation is £14,494. The Directors recommend the payment of final dividends for the year of 2¾ p.ct. (actual) upon the preference shares, and of 4½ p.ct. (actual) upon the ordinary shares, making the total dividends for the year 5½ p.ct. upon the preference shares and 6½ p.ct. upon the ordinary shares (both less income-tax); that the sum of £3000 be added to the reserve fund (making that fund £120,000); and that the balance of £1111 be carried forward.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *June* 13.

There has been quite a fair demand for pitch for shipment during this month, and the price is not below 80s. net per ton f.o.b. For next season's shipment the market has not yet settled, but is called 75s. to 80s. net per ton in bulk.

Creosote is still steady at 8¾d. per gallon net and naked.

Tar spirits are quiet and unchanged.

Tar Products in the Provinces.

June 13.

The average values of gas-works products during the week were: Gas-works tar, 54s. 3d. to 59s. 3d. Pitch—East Coast, 70s. to 75s. f.o.b. West Coast—Manchester—67s. 6d. to 74s. 6d.; Liverpool, 70s. to 75s.; Clyde, 72s. 6d. to 75s. 9d. Benzole, 90 p.ct. North, 1s. 3d. to 1s. 4d.; crude, 65 p.ct. at 120° C., 10½d. to 10¾d., naked, at makers' works; 50-90 p.ct. naked, North, 1s. 4d. to 1s. 5d. Toluole, naked, North, 1s. 4½d. to 1s. 5½d., nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 1s. 0½d. to 1s. 1½d. Heavy naphtha, North, 1s. to 1s. 1d. Creosote, in bulk, North, liquid, 7½d. to 7¾d.; salty, 7½d. to 7½d.; Scotland, 7½d. to 7¾d. Heavy oils, in bulk, North, 9d. to 9½d. Carbolic acid, 60 p.ct., 2s. 4d. prompt. Naphthalene, £11 to £14; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Cheaper Gas at Burton.—This year the Burton Gas-Works made a profit of £205, as against a loss of £9896 for the previous year; and it has been decided to reduce the price of gas by 1½d. per therm, to pre-strike level.

Reduction in Price at Hereford.—At a recent meeting of the Hereford City Council, Alderman Witts (Chairman of the Gas Committee) said that the Committee had decided to reduce the price of gas by 6d. per 1000 c.ft. The recommendation was approved.

Reduction in Price at Wellington.—The Wellington (Salop) Gas Company have reduced the price of gas by 7d. per 1000 c.ft., to take effect after the reading of the meters for the current quarter. This brings the price to the same as that ruling at the beginning of the coal **trouble.**

Sheffield's Public Lighting.—The "Sheffield Daily Independent" for Friday, June 3, states that in a few years the whole of the public lighting will be controlled by clockwork. During the past twelve months 1100 obsolete lamps have been replaced by new square copper lanterns. In addition, 1000 have been modernized in the workshops of the Lighting Department, of which Mr. J. F. Colquhoun is Superintendent.

Loss at Darwen.—The annual report of the Darwen Gas Department shows a loss of £12,262, the largest loss the Department has sustained in any one year. This was due to the coal dispute. On an average, coal cost £1 per ton more than normal. The stock of 6000 tons on hand when the struggle commenced ought to have lasted twenty weeks, but the greater demand for gas caused the stock to be exhausted by the middle of August. In addition, 700 tons were released for domestic supplies. The Committee, however, felt justified in recommending a reduction of 3d. per 1000 c.ft. from July 1.

Reductions in Scotland.—The West Kilbride Gas Company are reducing the price of gas by 1s. 8d. per 1000 c.ft. The Johnstone Council last week decided to reduce the charge by 8d. per 1000 c.ft. This brings it from 3s. 6d. to 2s. 10d. per 1000 c.ft. The Greenock Gas Committee agreed last week to recommend a reduction to ordinary consumers of 8d. per 1000 c.ft. as from May 15, and 2d. per 1000 c.ft. as from Nov. 15. The Lochgelly Gas Company have reduced the charge for gas by 8d. per 1000 c.ft. The new price is 5s. 5d. In Shotts, the Stane and Dykehead Gas Company, Ltd., have reduced the price for domestic purposes by 1s. 3d. per 1000 c.ft.

Excellent Results at Huddersfield.—The output of gas at Huddersfield during the past financial year was 1,438,865 c.ft., an increase on the previous year of 79,462,000 c.ft. The price of gas, which is 3s. 2d. per 1000 c.ft., remained at that figure throughout the period of the coal dispute. The total income amounted to £357,255, against £300,047, an increase of £57,208. The expenditure for the year was £351,826 (including interest and sinking fund charges), against £288,397, an increase of £63,428—leaving a net surplus for the year of £5429. At the Council meeting, the Mayor (Mr. R. Mitchell, J.P.), who is Chairman of the Gas Committee, submitted the report and balance-sheet to the Council as being highly satisfactory. Alderman Dawson (the Chairman of the Finance Committee) referred to the financial result and growth of the undertaking as being wonderful. The record is certainly one upon which Mr. Harold Singleton (the Engineer and Manager) is entitled to congratulation.

For stealing 11s. 10d. from a prepayment meter in his father's house, Alexander Currie, Jun., of Renton, was at Dumbarton Sheriff Court sentenced to fourteen days' imprisonment.

"Bennah" is the title of a Company registered, with a capital of £4000, to acquire from Mr. S. Simpson inventions relating to the manufacture of gas meters, and to carry on the business of engineers.

It was reported at a meeting of the Yeovil Board of Guardians that a letter had been received from the Yeovil Electric Light and Power Company offering to supply electricity to the institution; but the Board approved of the House Committee's unanimous decision to reply that they were in favour of continuing with gas.

STOCK MARKET REPORT.

After the holiday, business on the Stock Exchange began very slowly; and although industrial specialities were again sought after, conditions generally were dull and uninteresting. Anxiety over the monetary situation accentuated the general depression, and the position was not improved by the pessimistic views expressed with regard to the coal industry. There was an early decline in gilt-edged securities, but prices recovered towards the end of the week. Victory Bonds were particularly in demand by reason of the drawing which takes place on June 21.

In the Foreign Market the bright spot was the recovery in Chinese loans; but otherwise it was a quiet market. Much interest was taken in the Greek Land Mortgage Bank loan of £2,000,000 in 7 p.c. bonds at 93½ offered at the week-end.

Of the Industrial specialities, Courtaulds, Colombia, Gramophone, Swedish Match, and Henley's Telegraph were most in demand, and the excellent results reported by the Shell Transport brought in a large number of inquiries.

The Gas Market was apparently beating time. Transactions were confined to forced sales; and, with the exception of a rise of 2 points in Brighton and Hove 6 p.c. consolidated, 1 point in the Commercial 4 p.c., and falls at the local exchanges of 1 point in the Newcastle and Gateshead consolidated and ½ point in the Bristol 5 p.c. maximum, there were no variations in the quotations. It will be gratifying to holders of gas stocks to know that reports from the various companies indicate a satisfactory increase of business during the half-year.

The following transactions were recorded during the week:

On Tuesday, Brighton and Hove 5 p.ct. 92½, Cardiff 102¾, Continental Union 35, European 6¾, Gas Light and Coke 87½, 87¾, 3½ p.ct. maximum 61, 4 p.ct. preference 76, 76½, 77½, 3 p.ct. debenture 59, Plymouth and Stonehouse 5 p.ct. 109½, 110, Primitiva 14s. 3d., 14s. 4½d., 14s. 7½d., 14s. 9d., South Metropolitan 101½, 101¾. Supplementary prices, British 5 p.ct. debenture 97⅝, 97½, Yorktown new 5 p.ct. preference 88½, 89.

On Wednesday, Bournemouth 5 p.ct. 12½, Brighton and Hove 5 p.ct. 94½, Commercial 4 p.ct. 88, 3½ p.ct. 87, 87½, 87¾, 3 p.ct. debenture 59, 59¾, Hastings and St. Leonards 5 p.ct. 92½, Imperial Continental 138½, 139, 139½, Montevideo 90½, 91, Newcastle 74½, Primitiva 14s. 4½d., 14s. 7½d., Sheffield "C" 98½, South Metropolitan 101¼, Tottenham "B" 91¾, 92, Uxbridge, Maidenhead, 5 p.ct. preference 86½. Supplementary prices, Folkestone 67, Liverpool 5 p.ct. 84⅞, North Middlesex 7½ p.ct. debenture 101, Yorktown and Blackwater new 5 p.ct. preference 89.

On Thursday, Alliance and Dublin 84¾, Bournemouth "B" £12 10s. 9d., British 4 p.ct. debenture 75½, Commercial 4 p.ct. 88½, 88¼, Continental Union 34½, 35, 35½, 36, Croydon sliding-scale 98, 99, Gas Light and Coke 87½, 87¾, 87⅝, 87¾, 88, 4 p.ct. preference 77½, 3 p.ct. debenture 59½, Imperial Continental 140, Primitiva 14s. 4½d., 14s. 6d., 14s. 7½d., South Metropolitan 101, 101½, 101⅞, 102, South Suburban 5 p.ct. 104½, 105. Supplementary prices, Croydon 5 p.ct. debenture 91.

On Friday, Bournemouth "B" 12½, 4 p.ct. debenture 75½, Commercial 4 p.ct. 88½, 3 p.ct. debenture 58½, European 6¾, Gas Light and Coke 87½, 87⅛, 87⅝, 88, 88¼, 3½ p.ct. 60¾, 3 p.ct. debenture 59, 6 p.ct. Brentford debenture 104, 5 p.ct. debenture 100¾, 101, Imperial Continental 139, 140, Primitiva 14s. 4½d., South Metropolitan 100½, 101.

As is usual at the week-end, money was plentiful in Lombard Street. Lenders other than the clearing banks lowered their charge for renewing day-to-day loans to 3½ p.ct., and fresh overnight accommodation was obtainable at from 3½ p.ct. down to 3 p.ct. Discount quotations were well maintained, and the result of the Treasury Bill allotment was evidence of the firmness of the market. The average rate was again higher at £4 7s. 6·93d. p.ct.

In the Foreign Exchange Market the Dollar-Sterling was steady, and finished unaltered at 4.85½⅛. The changes in European currencies were small and unimportant only. Spanish pesetas were still in demand, and the price fell to 28.05. Italian lire declined to 88.07½; and the French rate kept steady at 124. Belgas were unchanged at 34.96½.

Silver was slightly cheaper at 26 5/16d. per oz., and Gold remained unchanged at the nominal price of 84s. 11½d. per oz. £570,000 of bar gold is expected to reach the market this week.

The Bank Rate is 4½ p.ct., to which it was reduced from 5 p.ct. on April 21. Bankers' deposit rates are 2½ p.ct. The deposit rates of the discount houses are 2½ p.ct. at call and 2¾ p.ct. at notice.

Issue.	Shares.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. June 10.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Feb. 10	5	5	Aldershot 5 p.c. max. C.	70—73	..	..
229,992	,,	,,	4	4	Do. 4 p.c. Pref.	66—71	..	..
1,551,868	,,	Apl. 7	6½	7	Alliance & Dublin Ord.	84—87	..	84½
374,000	,,	Jan. 13	4	4	Do. 4 p.c. Deb.	65—68	..	..
800,000	1	Apl. 28	1/7½	1/7½	Bombay, Ltd.	1—1½	..	..
170,000	10	Mar. 10	8½	8½	Bournemouth 5 p.c.	12½—13½	..	12¾
800,050	10	,,	7	7	Do. B 7 p.c.	11½—12½	..	12½—£12/10/9
275,000	10	,,	6	6	Do. Pref. 6 p.c.	10½—11½	..	..
50,000	Stk.	Jan. 13	3	3	Do. 3 p.c. Deb.	53—56	..	..
163,025	,,	,,	4	4	Do. 4 p.c. Deb.	75—78	..	75½
357,900	,,	—	—	—	Brighton & Hove 6 p.c. Con.	104—109	+2	..
341,800	,,	—	—	—	Do. 5 p.c. Con.	90—95	..	92½—94½
1,227,500	,,	Feb. 24	5	5	Bristol 5 p.c. max.	88½—89½a	−½	..
855,000	,,	Mar. 24	8	7	British Ord.	106—109	..	..
100,000	,,	Dec. 30	7	7	Do. 7 p.c. Pref.	112—117	..	..
180,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	75—80	..	75½
160,000	10	May 26	6	8	Cape Town, Ltd.	7¼—8¼*	..	..
100,000	10	Apl. 28	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
150,000	Stk.	Dec. 30	4½	4½	Do. 4½ p.c. Deb.	70—75	..	..
668,880	,,	Feb. 24	6	6	Cardiff Con. Ord.	99—102	..	102½
327,880	,,	Dec. 30	7½	7½	Do. 7½ p.c. Red. Deb.	100—108	..	..
157,150	,,	Feb. 24	5	6½	Chester 5 p.c. Ord.	86½—91½b	..	..
79,185	1	Apl. 28	†2/-	†2/-	Colombo Ltd. Ord.	26/—28/-	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	20/—22/-	..	..
221,490	1	Apl. 7	1/9½	1/9½	Colonial Gas Assn. Ld. Ord.	24/6—26/6	..	..
178,900	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	20/—22/-	..	..
1,513,280	Stk.	Feb. 24	5½	6½	Commercial 4 p.c. Cap.	87—90	+1	88—88½
450,000	,,	,,	5/8/4	5/8/4	Do. 8½ p.c. Cap.	85—88	..	87—87½
475,000	,,	Dec. 30	8	8	Do 3 p.c. Deb.	56—59	..	58½—59½
800,000	,,	Sept. 30	‡2	‡1	Continental Union, Ltd.	32—37	..	34½—36
200,000	,,	Mar. 10	7	7	Do. 7 p.c. Pref.	79—82	..	..
787,580	,,	Mar. 10	6½	6½	Croydon sliding scale	96—99	..	98—99
498,100	,,	,,	5	5	Do. max. div.	77—80	..	..
492,370	,,	Feb. 24	6	9	Derby Con.	104—106c	..	..
55,000	,,	Dec. 30	4	4	Do. Deb.	73—75c	..	..
209,000	,,	Mar. 10	5	5	East Hull Ord. 5 p.c.	76—80	..	..
50,000	,,	Dec. 30	5	5	Eastbourne 5 p.c. Deb.	92—97	..	..
1,002,180	10	Mar. 24	‡3	‡3	European, Ltd.	6½—7½	..	6¾
10,747,480	Stk.	Feb. 10	5/1/4	5	Gas Light & Coke 4 p.c. Ord.	86½—88½	..	87½—88½
3,600,000	,,	,,	3½	3½	Do. 8½ p.c. max.	59—61	..	60½—61
4,187,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	76—78	..	76—77½
5,602,890	,,	Dec. 30	3	3	Do. 3 p.c. Con. Deb.	58—60	..	59—59½
181,318	,,	,,	—	6	Do. 6 p.c. Br'tf'd Rd. Db.	100—105	..	104
1,642,770	,,	,,	—	5	Do. 5 p.c. Red. Deb.	99—101	..	100¾—101
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
93,500	,,	Mar. 10	6½	6½	Hastings & St L. 5 p.c. Conv	90—92	..	92½
369,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	67—72	..	..
70,000	10	Apl. 28	†10	†10	Hongkong & China, Ltd.	12—18	..	..
178,200	Stk.	Mar. 10	5	5	Hornsey Con. 3½ p.c.	67—69	..	..
1,976,000	,,	May 12	10	10	Imperial Continental Gas.	137—141	..	139½—140
283,130	,,	Feb. 10	3½	3½	Do. 3½ p.c. Red. Deb.	69—71	..	..
235,342	,,	Mar. 10	6½	6½	Lea Bridge 5 p.c. Ord.	92—97	..	..
2,145,907	,,	Feb. 24	5½	5½	Liverpool 5 p.c. Ord.	84—85b	..	..
600,000	,,	Sept. 30	7	7	Do. 7 p.c. Red. Pref.	102—104b	..	..
165,736	,,	Feb. 24	9	8	Maidstone 5 p.c. Cap.	110—115	..	..
63,480	,,	Dec. 30	3	3	Do. 3 p.c. Deb.	52—57	..	..
75,000	5	Dec. 9	†7	†7	Malta & Mediterranean	5½—6½	..	..
841,930	Stk.	May 26	†5	†7	Montevideo, Ltd.	87—92*	..	90½—91
2,061,815	,,	Feb. 24	5	5	Newcastle & Gateshead Con.	74—75d	−1	..
360,929	,,	,,	4	4	Do. 4 p.c. Pref.	68—69d	..	..
691,705	,,	Dec. 30	3½	3½	Do. 3½ p.c. Deb.	68—69d	..	..
131,795	,,	—	—	—	North Middlesex 6 p.c. Con.	91—93	..	..
800,000	,,	Apl. 28	9	7	Oriental, Ltd.	97—102	..	..
188,120	,,	Dec. 30	7½	7½	Plym'th & Ston'house 5 p.c.	105—110	..	109¼—110
414,800	,,	Feb. 24	7½	7½	Portsm'th Con. Stk. 4 p.c. Std.	100—105	..	..
295,722	,,	,,	5	5	Do. 5 p.c. max.	76—79	..	..
2,230,909	1	—	—	—	Primitiva Ord.	14/—15/-	..	14/3—14/9
382,200	100	June 1	4	4	Do. 4 p.c. Red. Deb.	84—86*	..	..
600,000	Stk.	Jan. 27	4	4	Do. 4 p.c. Red. Deb. 1911	70—72	..	..
434,968	,,	Dec. 30	—	4	Do. 4 p.c. Cons. Deb.	70—72	..	..
150,000	10	Mar. 24	6	6	San Paulo 6 p.c. Pref.	7½—7¾	..	..
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	47—50	..	..
270,000	Stk.	Mar. 24	5½	5½	Sheffield A	98—100	..	..
419,968	,,	,,	5½	5½	Do. B	98—100	..	..
1,047,000	,,	,,	5½	5½	Do. C	98—100	..	..
90,000	10	May 26	4	0	South African	4—6*	..	..
6,609,895	Stk.	Feb. 24	5	7	South Met. Ord.	100—102	..	100½—102
1,895,445	,,	Jan. 13	3	3	Do. 3 p.c. Deb.	57—60	..	..
784,000	,,	Mar. 10	6½	6½	Do. 6½ p.c. Red. Db.	99—101	..	..
91,500	,,	Feb. 24	8½	8½	South Shields Con.	104—106d	..	..
1,948,795	,,	Mar. 10	6½	6½	South Suburban Ord. 5 p.c.	103—106	..	104½—105
958,837	,,	Dec. 30	5	5	Do. 5 p.c. Deb.	94—97	..	..
647,740	,,	Mar. 24	5	5	South'mpton Ord. 5 p.c. max.	74—77	..	..
121,375	,,	Dec. 30	4	4	Do. 4 p.c. Deb.	68—73	..	..
250,000	,,	Feb. 24	7	7	Swansea 7 p.c. Red. Pref.	100—102	..	..
200,000	,,	Dec. 30	6½	6½	Do. 6½ p.c. Red. Deb.	102—104	..	..
120,000	,,	Feb. 24	7½	7½	Tottenham District A 5 p.c.	105—110	..	..
882,275	,,	,,	6½	6½	Do. B 5½ p.c.	90—93	..	91½—92
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	97—100	..	..
181,255	,,	Dec. 9	4	4	Do. 4 p.c. Deb.	72—75	..	..
369,351	,,	Mar. 10	5	5	Tynemouth Con. and New	71—72d	..	..
197,294	,,	Mar. 10	6½	6½	Uxbridge, Maidenhead, & Wycombe 5 p.c.	85—90	..	..
88,880	,,	,,	5	5	Do. 5 p.c. pref.	83—88	..	86½
91,800	,,	,,	6½	6½	Do. 5 p.c. Maidenh'd	83—88	..	..
80,000	,,	Mar. 10	8½	8½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	120—125	..	..
355,636	,,	,,	7	7	Do. B 5½ p.c.	102—107	..	..
482,535	,,	,,	5/19/0	5/19/0	Do. C and New	90—95	..	..
859,000	,,	,,	6½	6½	Wimbledon 5 p.c.	98—103	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	103—108	..	..
38,416	,,	Dec. 30	3	3	3 p.c. Deb.	54—57	..	..

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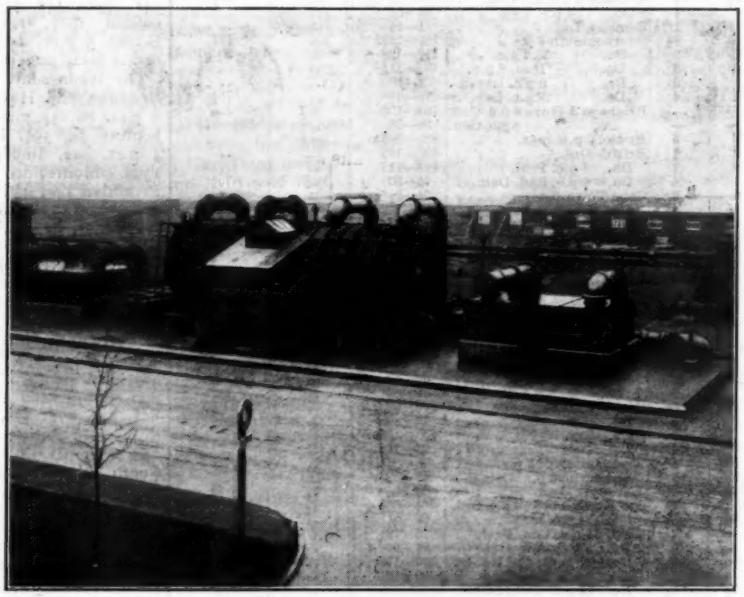

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TELEGRAMS "HOLMES HUDDERSFIELD"

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INSTITUTION OF GAS ENGINEERS.

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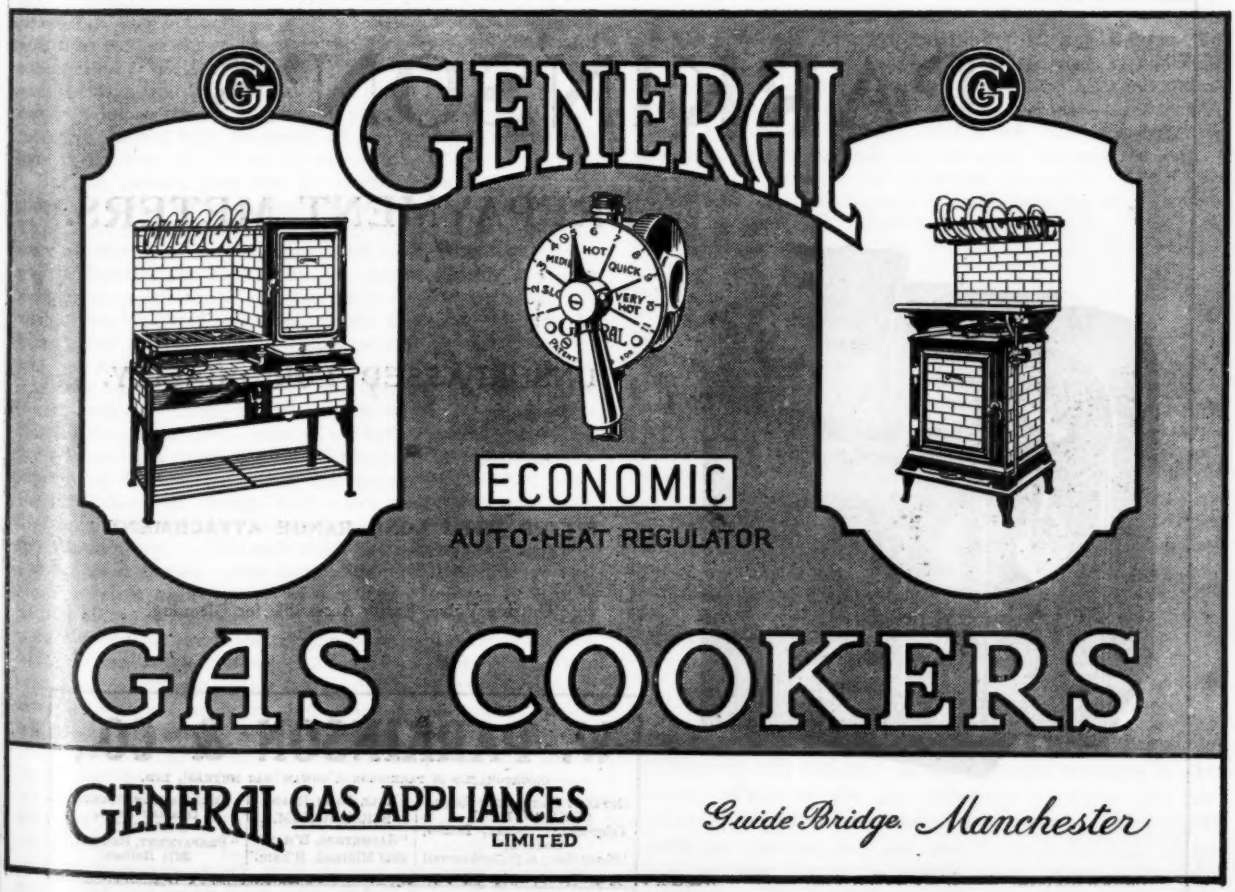

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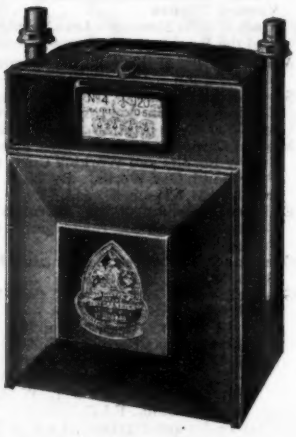

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